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CHIEFLY TO THE BIRDS ON THE BRITISH LIST

EDITORS

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and
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Volume XLIX

1956

BRITISH MUSEUM
Z D
NATURAL HISTORY

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In the captions to plates 5, 6, 7, 57, 60, 61 and 62, as printed beneath the photographs, the locality is wrongly given as "Austria"; these photographs were all taken in the Oberlausitz which is East Saxony and therefore part of Germany, not Austria. In the case of the Cranes this error is particularly unfortunate because, as has been pointed out to us by several correspondents, this species has not been known to breed in Austria in recent years. We take this opportunity of apologising to Mrs. Ilse Makatsch for the mistake.

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BRITISH BIRDS

PURCHASED

JANUARY 1956

THREE SHILLINGS

BRITISH BIRDS

AN ILLUSTRATED MONTHLY MAGAZINE

Edited by
E. M. Nicholson
W. B. Alexander   A. W. Boyd
I. J. Ferguson-Lees
P. A. D. Hollom   N. F. Ticehurst

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Vol. XLIX
No. 1

JANUARY
1956

BRITISH BIRDS

EDITORIAL

SCIENTIFIC AND ENGLISH NAMES

Three years have gone by since the British Ornithologists' Union's *Check-List of the Birds of Great Britain and Ireland* was published. Now that some of the dust has settled it is possible to look afresh at the main problems which were in part resolved and in part left over or even aggravated by that event.

At much inconvenience and in some haste the Editors of *British Birds* promptly adopted from the New Year of 1953 the revised arrangement of orders and families, starting with the divers and ending with the sparrows. We were, however, compelled by the numerous deficiencies of the *Check-List* which we pointed out at the time (*antea*, vol. xlvi, pp. 1-3 and 114-116) to make many reservations over following it in other respects. Other detailed and critical comments were published, notably by Col. R. Meinertzhagen and Mr. K. Williamson (*Ibis*, 1953, vol. 95, pp. 365-369). The British List Sub-Committee responsible for the *Check-List* was dissolved in December 1952, and was replaced a year later by two new B.O.U. Sub-Committees with limited terms of reference. The first was a British Records Sub-Committee to advise on the authenticity of records of species or races proposed for inclusion in the British List, under the chairmanship of Mr. A. W. Boyd. The second was a Taxonomic Sub-Committee, to advise on taxonomic questions, and more particularly the validity of species or races included in the British List or in communications to the *Ibis,* under the chairmanship of Colonel R. Meinertzhagen.

At the XIth International Ornithological Congress held at Basle in May and June 1954, Professor Stresemann took the initiative in an informal discussion aiming to promote better co-ordination particularly in the policy and practice of European ornithological journals on such matters. As we had pointed out in adopting the altered arrangement, it brought us into line with most other countries. It was felt, however, that avoidable confusion was caused by some countries following the one order while the rest followed the other. It was agreed at that meeting that the "Wetmore" order, beginning with the divers and ending with the Passerines, should become the accepted usage in Europe as it already was in the Americas and elsewhere. An international committee of editors of ornithological journals was set up with the object of achieving a standard arrangement of genera and species within the Wetmore sequence of orders and families, and it is understood that the *Check-list of Birds of the World* by J. L. Peters and his colleagues will form the basis of the sequence to be adopted.

The British Trust for Ornithology issued in 1953 (with the co-operation of the Records Committee of the Ornithological Section of the London Natural History Society) a *Field List of British Birds* other than rarities of, in most cases, less than 50 recorded occurrences. The *Check-List* order and numbering were followed, but the English names followed the usage of *British Birds* where it differs from the *Check-List*, except in not admitting "Dunnock" as an allowable alternative to "Hedge Sparrow".

Another development since the *Check-List* has been the prolonged consideration by the International Commission on Zoological Nomenclature of a number of recommendations for generic or specific names differing from those which were adopted by the *Check-List*. This has aggravated the dilemma which we have previously pointed out (*antea*, vol. xlvi, p. 115) whether to follow the B.O.U. *Check-List* or whether to conform with the B.O.U.'s earlier (1951) ruling that International Commission's decisions should be observed. To us the second of these courses seems preferable, and this alone would undermine the title of the *Check-List* as an authoritative guide to be followed automatically.

Having briefly reviewed events since the *Check-List* was published, we must next discuss equally briefly the present situation as regards the British List, the order of scientific classification used in it, the choice of scientific names, and the use of English names.

With the setting up of the new B.O.U. Sub-Committee on additions to the British List, we are now working in the closest co-operation with the B.O.U. on this matter. We conduct joint deliberations into the claims of any new bird, and by mutual consent no record has been admitted by either party that is not acceptable to both. Thus by the time the record of a new species appears in *British Birds* it has already been considered by the B.O.U. Sub-Committee. It is hoped that in this way risks of divergence or confusion in the treatment of new records will be virtually eliminated. It must, however, be recognized that according to the best modern practice some past decisions affecting the inclusion or exclusion of birds from the British List cannot be regarded as satisfactory: this was illustrated by the paper on "American land-birds in Western Europe" by W. B. Alexander and R. S. R. Fitter (*antea*, vol. xlviii, pp. 1-14). The task of revision is heavy, but it cannot be indefinitely postponed.

The order of the scientific classification has been discussed already, arising out of the Basle meeting. It is clearly essential that the same arrangement should be adopted so far as possible in every country and that once adopted it should not be changed again unless for some overwhelmingly strong reason and by international agreement. It is to be hoped that the uniformity for which so much has been sacrificed is now in sight. Certainly the great majority of County Reports and other new publications in Great Britain are conforming so far as possible, but there is still an unfilled requirement for an up-to-date and authoritative European Check-List, since the otherwise admirable *Field Guide to the Birds of Britain and Europe* contains certain anomalies in arrangement similar to those of the B.O.U. *Check-List;* moreover, it may be regarded as certain that the order recommended by the international committee will be rather different, particularly as regards the sequence of the Passerines. Is it too much to hope that this requirement may be met before the 1958 Congress in Finland?

As regards scientific names, the over-riding need once more is for uniformity and permanence based on authoritative and internationally accepted rulings, and changes other than to achieve uniformity are becoming increasingly hard to justify. The International Commission on Zoological Nomenclature is, we understand, considering the stabilization of a number of names which have suffered changes in recent years. This seems a most desirable step, and we propose to bring our nomenclature into line with their decisions as soon as these are published. In the meantime we continue to use the scientific names of the *Handbook*, with the following exceptions:

English name	Handbook	Current usage
Divers	*Colymbus*	*Gavia*
Shearwaters	*Puffinus*	*Procellaria*
Cory's Shearwater	*P. kuhlii*	*P. diomedea*
Mallard	*A. platyrhyncha*	*A. platyrhynchos*
Pink-footed/Bean Geese	*A. fabalis*	*A. arvensis*
Golden Eagle	*A. chrysaëtus*	*A. chrysaëtos*
Kentish Plover	*Leucopolius*	*Charadrius*
Killdeer	*Oxyechus*	*Charadrius*
Caspian Plover	*Eupoda*	*Charadrius*
Grey Plover	*Squatarola*	*Charadrius*
Golden Plovers	*Pluvialis*	*Charadrius*
Dotterel	*Eudromias*	*Charadrius*
Common Sandpiper	*Actitis*	*Tringa*
Spotted Woodpeckers	*Dryobates*	*Dendrocopos*
Song Thrush	*T. ericetorum*	*T. philomelos*
Black Redstart	*Ph. ochrurus*	*Ph. ochruros*
Nightingale	*L. megarhyncha*	*L. megarhynchos*
Bluethroats	*Luscinia*	*Cyanosylvia*
Rose-coloured Starling	*Pastor*	*Sturnus*

We also propose to follow the B.O.U. *Check-List* and other recent publications in abandoning the tiresome use of diphthongs in scientific names.

Finally we come to the controversial subject of English names. Following our previous Editorial we received a number of letters on this subject. Certain correspondents expressed general objections to any change. Several commented adversely on attempts to reconcile British and American differences in naming a species known on both sides of the Atlantic, and among the American names objected to were "Yellowlegs" for "Yellowshank", "Baldpate" for "American Wigeon" and "American Nighthawk" for "American Nightjar". Some objections were also raised against dropping the prefix "Common" before, for example, "Buzzard", "Partridge" or "Heron". The use of "dialect names", especially "Dunnock" and "Yellowhammer", also drew criticism. Grammatical and other aspects of the omission of hyphens from many names were questioned by some, but the simplification was supported by others. On the other hand, several correspondents argued that the changes did not go far enough in certain directions, and that in particular "Large Egret" should be adopted instead of "Great White Heron"; "Pied" and "Barred" Woodpecker instead of "Great" and "Lesser Spotted"; "Least Crake" instead of "Baillon's Crake"; "Merehen" instead of "Moorhen"; and "Moor Pipit" instead of "Meadow Pipit", among others. It was also argued that English names in use in Asia should be adopted for birds originating in that part of the world and occurring here only as vagrants. There was little in common among the opinions received beyond the conviction with which they were expressed and the strong minority who disliked (either in principle or in its practical application) the adoption of transatlantic English names.

A number of correspondents advanced principles which in their view ought to be followed. Some thought that change causes so much trouble that it can only be justified "where the new name is markedly more suitable than the old, or where the new name has already become completely adopted". Others argued the importance of consistency throughout, some reaching the conclusion that more extensive changes are needed to secure it, and others that the task is impossible and therefore there should be no change at all. Several laid much emphasis on the ugliness or unwieldiness or unfamiliarity of certain names, or conversely on the advantages of changing to certain names which sound better, or are briefer or have established themselves as "coined".

It will be apparent from this summary that our hopes of a clear expression of some definite prevailing opinion were not realised, but that the variety of standpoints among ornithologists was strongly brought out by our correspondents, to whom we are grateful and whose often conflicting views have been most carefully studied and compared. After careful consideration we decided that it would be best to allow more time for reflection, and for the changes published in 1952-1953 to be tried out in practice, rather than to add fuel to controversy by publishing such a variety of strongly conflicting views so soon after the appearance of the *Check-List*. The thought which has been devoted to the problem by many ornithologists has not yet pointed to any generally acceptable course for the future, but the issues have been clarified and some progress is being made towards formulating a promising basis for discussion.

In the circumstances we think that a period of stability and settling down will be most helpful, and we do not therefore propose, so far as *British Birds* is concerned, to introduce any further changes at the present time, with three comparatively trivial exceptions which we are already using, these being the omission of hyphens in the spelling of "Sparrowhawk" and "Paddyfield Warbler" and the compression of the troublesome "Sheld-duck" into "Shelduck," on the analogy of the older name "Sheldrake" and following the practice adopted by Jean Delacour in *The Waterfowl of the World*.

Looking back over the past three years it is evident that real progress has been made, even though more could have been achieved had the more conspicuous faults in the B.O.U. *Check-List* been eliminated during its slow and measured journey towards publication. In principle the revised arrangement of the British List is accepted by the large majority of British ornithologists. The use of the same arrangement by most of the European ornithological journals is now in sight. The machinery of the International Commission on Zoological Nomenclature, although slow-moving, does promise the eventual achievement of international uniformity in the use of generic and specific names, so that scientific names will once more regain the world-wide meaning and usefulness which the apathy of most ornithologists had permitted to be nibbled away by generations of industrious pedants. The machinery for settling the validity of additions to the British List is greatly improved and is now working satisfactorily. As regards English names there is no such tidy solution, not through want of initiative but owing to serious doubts whether it is desirable to fetter the free development of this part of the English language by creating some authoritative body to give rulings on the subject. Certainly it would have been absurd to resign ourselves to international chaos in Latin names, which are meant to be fixed and uniform, while imposing uniformity over English names, which are not. English names of birds are part of the English language, and should evolve with it. Nevertheless, it is obvious that excessive changing of English names is as undesirable as excessive rigidity, and here as in other fields some form of consultation between those mainly responsible for current practice may be advisable.

It would be pleasant to be able to reproduce here a final agreed and authoritative and up-to-date version of the British List, but that is not yet possible. However, the number of additions since 1950 (when the *Check-List* closed) and the number of necessary other revisions make it desirable to have available a provisional revised British List bringing together the names and arrangement which the Editors are currently using until it can be superseded by an internationally agreed version. We should like to compile such a list as soon as possible after the decisions of the committees dealing with arrangement and nomenclature are known, as a contribution towards the preparation of the European *Check-List* which we hope may be produced before long.

THE AUTUMN 1953 INVASION OF LAPLAND BUNTINGS AND ITS SOURCE

By Kenneth Williamson (*Fair Isle Bird Observatory*)
and
Peter Davis (*Skokholm Bird Observatory*)

INTRODUCTION

There were a number of remarkable features about the autumn migration of 1953, and not the least of these was the phenomenal invasion of Britain by Lapland Buntings (*Calcarius lapponicus*), which occupied at least a month from 3rd September.

This species has always been regarded as rare in Britain (though it is easily overlooked) except in certain favoured areas. There are localities in the south-east of England, notably Cley in Norfolk, where birds are seen in most winters; and since the foundation of Lundy Bird Observatory in 1948 it has been shown that the Lapland Bunting is a fairly regular autumn-migrant there in small numbers. It has long been known as a passage-migrant through certain of the northern isles, Clarke (1912) recording it regularly in autumn on his visits to Fair Isle, the Flannans and St. Kilda. Prior to 1953 the peak numbers recorded by Fair Isle Bird Observatory had fluctuated from a few to 40 or so in exceptional seasons such as 1949. *The Handbook* gives only four instances of its occurrence in Ireland, but in recent years P. S. Redman's work and the observations of I. C. T. Nisbet and others in the north-west have shown that here too it is a regular autumn-immigrant (Gibbs *et al.*, 1954; Redman, 1955).

Until attempts were made to analyse the Fair Isle movements in the light of the "migrational drift" concept (Williamson, 1952) the fact that these autumn-immigrants to the north and west of Britain could be Greenland birds does not seem to have been realized. Salomonsen (1951), whilst noting that some of the east-coast birds may wander to Iceland and the British Isles as vagrants, considers that the bulk of east and west Greenland birds winter in North America; whilst Bannerman (1953) explains these visitations as due to breeders from the fells of southern Norway. He cautiously admits, however, that "our knowledge of the migrations of the Lapland Bunting is far from complete".

The present authors have put forward their view, in a study of the 1952 movements, that the bulk of the birds entering Britain are of Greenland origin (Williamson, 1953; Davis, 1954). The exceptional strength of the 1953 invasion, together with the fact that daily observations on the migration were maintained throughout the whole period at three widely separated points on the western seaboard, afforded an excellent opportunity for a full study of the status of the Lapland Bunting in this country. Accordingly, a request for information was published in *British Birds*, and we express our gratitude to all those who have assisted by furnishing records. We are especially grateful to Mr. Redman for making his observations at Inishtrahull available to us at the outset of this study.

Much use has been made in this study of the *Daily Weather Report* of the Meteorological Office of the Air Ministry, and we are grateful to the Controller of Her Majesty's Stationery Office for permission to include diagrams based on the charts in the *Report*.

AUTUMN AND WINTER RECORDS, 1953-54

The following list summarizes the records which have reached us as a result of the appeal for information made in this journal (vol. xlvii, p. 95).

SCOTLAND.

Fair Isle: One, Sept. 3rd; three, 5th; then seen daily until end of month, with 75 on 9th, 80 on 12th, 55 on 16th, 60 on 19th, 45 on 23rd and 26th, 35 on 29th (K.W.)

Sutherland: Scourie—two, Sept. 15th (Sir Charles Connell).

East Langwell, Rogart—one, Dec. 1st (I. D. Pennie).

Midlothian: Gladhouse Res.—six plus, Oct. 25th (D. G. Andrew).

East Lothian: Aberlady Bay—two, Sept. 27th; and birds present on most week-ends until Feb. 21st, with 25 on Nov. 22nd and 10 on Dec. 6th the largest numbers reported (F. D. Hamilton, K. S. Macgregor).

Belhaven Sands—one, Dec. 13th (M. F. M. Meiklejohn); one, Dec. 27th (D. G. Andrew).

West Barnes, Tyninghame—12, Jan. 1st (F.D.H. and K.S.M.).

Tiree: One, Sept. 9th (Miss B. Whitaker).

IRELAND.

Inishtrahull: Birds passing on most days, Sept. 3rd to 27th, with 26 on 9th, 23 on 11th, 20 on 16th, 10 on 20th; two, Oct. 3rd; three, 5th. "It is estimated that over 60 different birds were involved." (P. S. Redman, I. C. T. Nisbet, A. Gibbs).

Co. Donegal: Malin Head—"Odd birds . . . on most days Sept. 3rd onwards" (to 29th), with 30 on 19th and many passing during 27th-29th. "Several hundreds appear to have been involved." (P.S.R., I.C.T.N., A.G.).

Co. Londonderry: McGilligan's Point—seven, Sept. 30th (I.C.T.N.)

WALES.

Skokholm: Two, Sept. 15th; one, 24th (P. Conder).

ENGLAND.

Northumberland: Monks' House—one, Nov. 8th (E. A. R. Ennion).

Co. Durham: Teesmouth—one, Sept. 13th and 20th; two, Oct. 18th; reported on eight days in November (16 on 14th); five, Dec. 5th, and 18, 6th; one or two on three days in January; one, Feb. 7th, and four, 14th; five, March 8th, and twelve, 13th-15th (D. R. Seaward *et al.*). The only previous record for this county was in 1860.

Yorkshire: Gouthwaite Res., Nidderdale—one "probable" in flight, Dec. 6th (A. F. G. Walker).

Gristhorpe Bay, Scarborough—one, Jan. 17th; two, 31st (A. J. Wallis).

Lincolnshire: North Cotes—present from Oct. 11th to Feb. 28th, usually scattered parties; about fifty, Dec. 13th (S. A. Cox, R. May).

Mouth of R. Witham—two or more, Nov. 1st (M. J. M. Larkin); at least three, Nov. 15th; one, Dec. 26th (I. C. T. Nisbet).

Holbeach St. Marks (Welland Estuary)—four or five, Nov. 29th (E. J. Cottier and A. E. Vine).

Norfolk: Wolferton (N.W. coast)—at least two, Nov. 6th (A.E.V.); at least one, Dec. 14th; one, 28th (I.C.T.N.).

Holme and Thornham—forty or more, Nov. 8th; about sixty, Nov. 15th (E.J.C., A.E.V., P. North); present, Dec. 28th (I.C.T.N.); about 35, Jan. 10th (P.N.); one, Mar. 14th (E.J.C.); three, Apr. 19th (T. Smout).

Gun Hill (E. of Scolt Head Island)—four, Nov. 29th (G. M. S. Easy, D. Farren); one, Dec. 13th (E.J.C., P.N., A.E.V.).

Cley-Blakeney area—one Dec. 29th (I.C.T.N.); two, Feb. 28th; one, March 20th (Cley B.O. *per* M. Seago). Did not winter this year.

Suffolk: Walberswick—four or five, Oct. 11th; eleven, 19th; smaller numbers to Nov. 22nd (W. M. Daly, A. Gibbs, Lowestoft and Suffolk Reports).

Essex: The Naze—one, Oct. 4th (R. V. A. Marshall).

Walthamstow Marshes—one, March 19th (Miss J. Jones).

[Middlesex: Perry Oaks S.F.—one " probable ", Oct. 10th (W.M.D., A.G.).]

Kent: Hoo Marshes—two, Sept. 10th; one, 14th (*Kent Bird Report*).

Neatscourt Marshes—one, Nov. 29th (*Kent Bird Report*).

Yantlet Marshes—ten plus. Dec. 30th; some, Jan. 3rd (J. J. Garr, K. H. Palmer, C. Peale).

Birds were also reported from the N. Kent marshes in the first four months of 1954 (*Kent Bird Report*).

Sussex: East Head (West Wittering)—one, Dec. 23rd; and one or two on other dates to Jan. 3rd; one, Jan. 17th; two, 31st (*per* G. H. Rees and G. des Forges).

Wiltshire: Swindon—four or five, Dec. 13th (G. L. Webber).

Lundy: One, Sept. 3rd, and birds almost daily to Oct. 18th, with 17 plus on Sept. 5th, 23 plus on 10th, 33 plus on 15th, 11 on 27th; one Nov. 5th and 8th; two, 16th; one, 17th; one, Feb. 2nd, 11th and 16th (P.D.).

It will be seen that with only three exceptions (Sutherland, Lundy and Swindon) all the November-March records are from coastal districts east of a line Edinburgh-Portsmouth. There is a marked preference for estuarine salt-marshes and similar areas, which are more extensive in lowland Britain than in the west. The concentration is nevertheless an interesting one, and gives support to the view that the small numbers found wintering in Norfolk in other recent years may in fact be of Greenland origin—as the 1953-54 birds must obviously be if the arguments set out in this paper are correct.

It seems likely from the records received that many of the immigrants did not remain to winter in Britain. No records from the North Sea and Atlantic coasts of Europe have reached us, but there are many places which may prove attractive. Lapland Buntings have wintered on the shores of Denmark and Germany (see Distribution Map in Peterson, Mountfort and Hollom's *Field Guide to the Birds of Europe*, 1954); they may do so in less frequently watched areas further south.

THE METEOROLOGICAL ENVIRONMENT

In examining the meteorological background of the several movements which took place in September 1953 we need consider only the three watchpoints where daily records of passage were maintained. These are Fair Isle in the north of Scotland, Inishtrahull off the northern coast of Ireland (360 miles south-west of Fair Isle), and Lundy off the north Devon coast (320 miles south-south-east of Inishtrahull). We shall consider two possibilities—

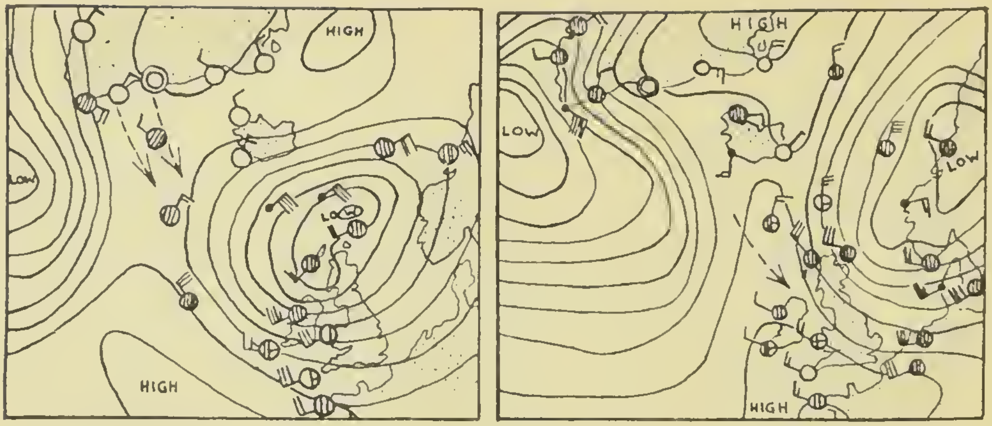
that the arrivals could have taken place (a) by down-wind drift from Greenland, either direct or via Iceland, or (b) by direct immigration on a south-west orientation, or by down-wind drift, from the Norwegian coast.

The coincidence that the first Lapland Bunting turned up at all three observatories on 3rd September suggests arrival from the west. It is reasonable to suppose that any movement out of Norway would have been noticed first of all at Fair Isle in the north, or at some east-coast observatory such as the Isle of May, and would not have reached Ireland or Devon until several days later. In point of fact there were 5 birds at Lundy on the 4th (but apparently none at Fair Isle) and an initial peak of 20 was recorded next day, with 3 only at Fair Isle. Inishtrahull too had increased passage.

Conditions were much more suitable for the inception of migration in Greenland, which had calm anticyclonic weather from the 1st to the 3rd, deteriorating in the south-east on the 4th, than was the case in Norway, which was covered by a vigorous low pressure system with its centre in Forties. Had cyclonic drift round this depression taken place from northern Norway, then Lapland Buntings should have first reached Fair Isle and not the more southerly stations, flying on a force 6-7 N.E. wind. As force 6 W. and S.W. winds were then blowing across the North Sea and into the Skagerrak a down-wind drift or a direct approach to Britain from that region of the Continent was physically impossible for any Passerine.

Thus, for this initial movement, Greenland is quite clearly indicated as the source. Collateral evidence is provided by the pattern of Wheatear (*Oenanthe oenanthe*) passage at Fair Isle during this period, practically all the birds handled between the 2nd and the 4th belonging to the Greenland race *OE oe. leucorrhoa*. (For details of these birds, see *Bull. Fair Is. B. Obs.*, vol. 2, pp. 35-37). All came in at very low weights for this race, confirming the theoretical assumption of a long cyclonic journey over the eastern Atlantic.

The weather situation during the first few days of the month was very complex. In the Atlantic a col of fine weather with light northerly winds existed between the Greenland and Azores highs and this col, moving eastwards behind the Forties depression, was penetrated on the 3rd by a ridge from the sub-tropical high pressure belt which later intensified over Britain. With a north to N.E. airstream in sea-area Fair Isle on the western periphery of the low such migration as had begun through this col on the 2nd, or followed via Iceland on the 3rd, would reach Britain through Rockall Seas and the Western Approaches in the region of light westerlies in this anticyclonic ridge. The first movement of Lapland Buntings, if they came from Greenland either direct or via the Iceland area, made their landfall where one would expect on the theory of migrational drift, namely in western rather than northern Britain (Figs. 1 a and b).



FIGS. 1 a and b.
Initial immigration of Lapland Buntings as deduced from the mid-day weather-charts for 2nd and 3rd September 1953, through an eastwards-moving col in mid-Atlantic succeeded by an anticyclonic ridge.

With a new and vigorous depression moving eastwards towards our area on the 4th, bringing a contrary windstream between Britain and Greenland, it seems probable that the continuing movement of Lapland Buntings at Lundy and Inishtrahull represents onward passage from Ireland and the Hebrides under the excellent conditions provided by the anticyclonic ridge. There is presumptive evidence that the 3 recorded at Fair Isle on the 5th were on passage, for on this day movement of White Wagtails (*Motacilla a. alba*) and intermediate Wheatears of the Faeroe-Iceland population (so-called *Oe. oe. schiøleri*) was resumed.

The next movement developed between 7th and 10th September, when the conditions in south-east Greenland were again anticyclonic and favourable for emigration. Wind-strength in Forties and on the coast of Norway on the 7th was force 8, its direction S.W. or W.S.W., so that again Passerine migration into Fair Isle from this quarter must be deemed impossible. Yet the invasion at Fair Isle at this period reached staggering proportions: there were 30 birds on the 8th and a flock of over 70, in addition to scattered individuals, on the 9th. At Inishtrahull there was a strong passage attaining a peak of 26 birds on the 9th. The movement through Lundy was poor by comparison, and did not reach a peak until the 10th.

A ridge of the Bermuda high brought west winds to Denmark Strait on the 7th, and during the 8th this high expanded eastwards, whilst another high developed over Britain. North of these two systems it was possible for the westerly wind-stream to bring birds direct from Greenland to Fair Isle and the northern tip of Ireland, but at Lundy, below the centre of high pressure, the winds were contrary (Fig. 2). However, the English high was displaced to the south-west during the 9th, so that a veer of wind took place in the eastern Atlantic and brought Lundy within the westerly airstream. Thus, on the theory of down-wind drift, the delayed peak at Lundy is satisfactorily explained.

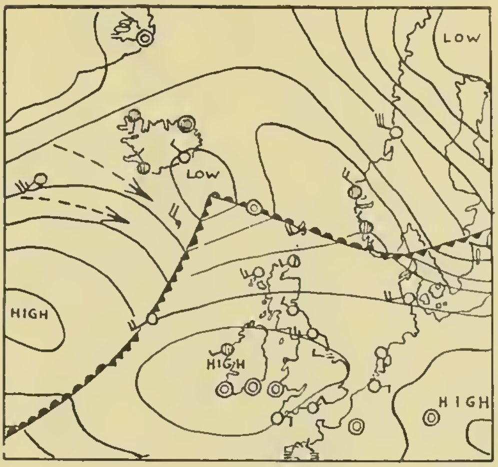


FIG. 2.—First major peak of Lapland Buntings (70+) at Fair Isle, 8th-9th September 1953, deduced from 0600 hrs. weather-chart for 8th. The high over southern Britain moved south-west on 9th to admit Lundy to the westerly airstream, resulting in a delayed peak there on 10th.

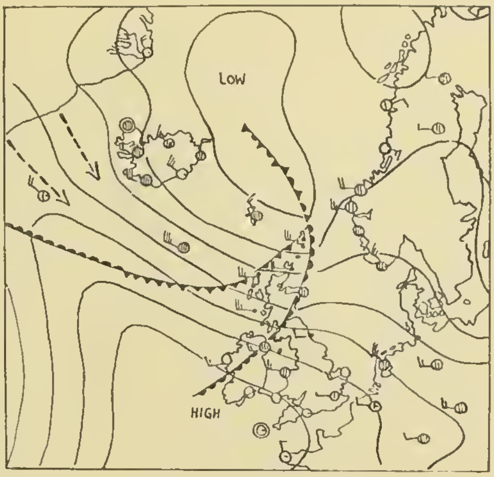


FIG. 3.—Second major peak of Lapland Buntings (80) at Fair Isle, 12th September 1953, in the complementary W.N.W. airstream between an Azores high and a depression east of Iceland, deduced from 0600 hrs. weather chart for 11th.

Inishtrahull and Fair Isle were again better placed in this westerly airflow on the 11th and 12th and arrivals continued, with an all-time record of 80 birds at Fair Isle on the 12th after about 45 on the previous day (Fig. 3). At the time of these major invasions the westerly airstream extended across Forties and it should be noted that such birds as overshot the northern islands would pass on to the Norwegian coast. Late in the period winds were strong in south-west Norway and a direct immigration of Scandinavian birds must be regarded as impossible.

A third peak of 35 birds took place at Lundy on the 15th and there appears to have been an increase at Inishtrahull the same day. The Fair Isle figure remained steady at about 35. Winds across the North Sea and on the Norwegian seaboard at this time were S.E. and a classic Continental "drift" was developing at Fair Isle (see Williamson, 1954 a). This airstream flowed between a Scandinavian high and a vast area of low pressure in the eastern Atlantic, beyond which there was a N.W. airstream between Greenland and south-west England (Fig. 4). It is reasonable to suppose that this, Lundy's third peak, came by a down-wind track from Greenland.

Increases at Inishtrahull and Fair Isle next day may have been due to coasting or onward passage from Iceland and Faeroe, through which a fair proportion of these buntings must pass in autumn; or, in the case of Fair Isle, to drift from southern Norway in the S.E. airstream which was still bringing Continental migrants across the North Sea. Coasting movement of Lapland Buntings, doubtless from the Hebrides, was certainly taking place

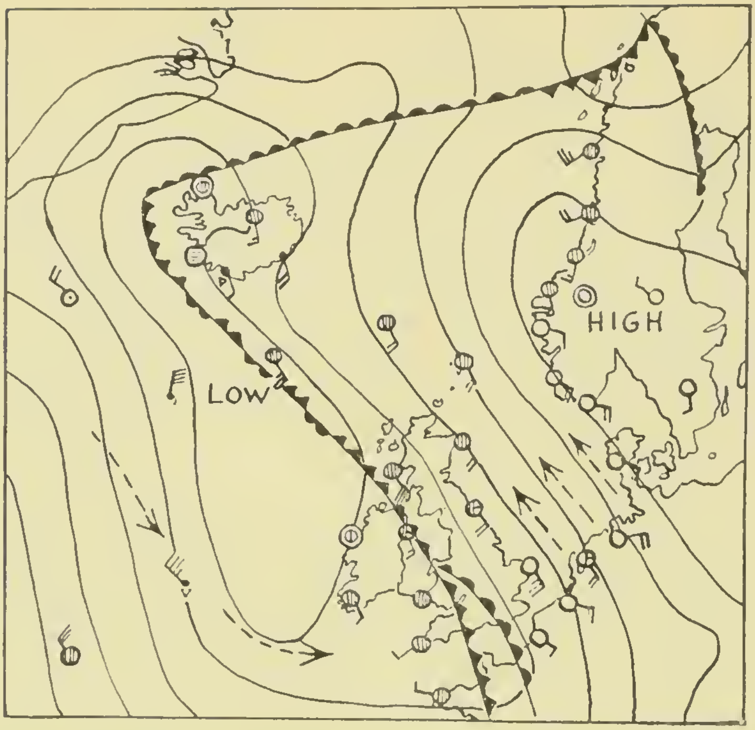


FIG. 4.—Lapland Bunting peak at Lundy only, 15th September 1953, derived by cyclonic drift from south-east Greenland simultaneously with the arrival of Continental migrants by anticyclonic drift at Fair Isle.

near Malin Head on the 18th and from the 27th to the 30th (Gibbs *et al.*, 1954), and a rise in number at Inishtrahull on the 20th coincided with a N.W. wind between Greenland and northern Ireland. An increase at Fair Isle during the 19th-20th may have been due once more to drift from southern Norway, as North Sea winds were still S.E. If Lapland Buntings were indeed reaching us in this way (and there seems little doubt that they were) then the question arises as to whether they were birds of North European stock, or drift-migrants which had entered Norway from Greenland between the 8th and the 12th. This question is discussed below.

Numbers rose again at Fair Isle on 26th September and at Lundy on the 27th: west of Iceland at this time there was a vigorous depression, with winds from southern Greenland N.W. backing westerly and then S.W. in the approach to the British Isles. Force 5-6 westerly winds in Forties make it appear unlikely that any birds could have crossed from Norway on a S.W.-orientated flight. Similar conditions, suggesting a cyclonic approach from Greenland, obtained on the 29th, when there was an increase at Fair Isle and movement on the coastal moors of north Ireland was heavy. Lundy was too far to the south of this airflow to be affected, but more birds arrived there and probably at Fair Isle too on 2nd October, this time with an anticyclonic system to the west.

MOVEMENTS IN PREVIOUS YEARS

1949.

Lapland Buntings passed through Fair Isle in considerable numbers in 1949, the invasion at its peak being at about half the 1953 scale, but less protracted. This abundance was the more surprising as odd birds only had been noted in the previous year. It was also a great Snow Bunting (*Plectrophenax nivalis*) season, and the first parties—40 of each species—were found on 10th September after weather suggesting a north-western origin. The White Wagtail movement reached its peak on this day and 7 Redpolls (*Carduelis flammea*) were noted. These were not identified subspecifically, but may well have belonged to the Greenland form *rostrata*, which is the most regular at Fair Isle. The weather in Greenland was calm, in Norway troubled by frontal disturbances with heavy rain and westerly winds; and in mid-Atlantic there was a vast anticyclonic system with a westerly airstream along its northern boundary (Fig. 5). However, the unprecedented influx of Snow Buntings, over 2,000 in number, on the 16th, coincided with a N.W. airflow between two low pressure centres in the eastern Atlantic and a S.E. cyclonic airstream in the North Sea, so their place of origin must remain indeterminate. The second Lapland Bunting peak, again 40 birds, followed next day, with the westerly wind persisting in the Atlantic between the low pressure centres but the chance of drift from the Skagerrak removed (Fig. 6). Totals of 20 and 30 Lapland Buntings on the 21st and 22nd were almost certainly derived from the Continent in easterly weather, but a further increase, with over 1,000 Snow Buntings, on the 25th took place with westerly winds.

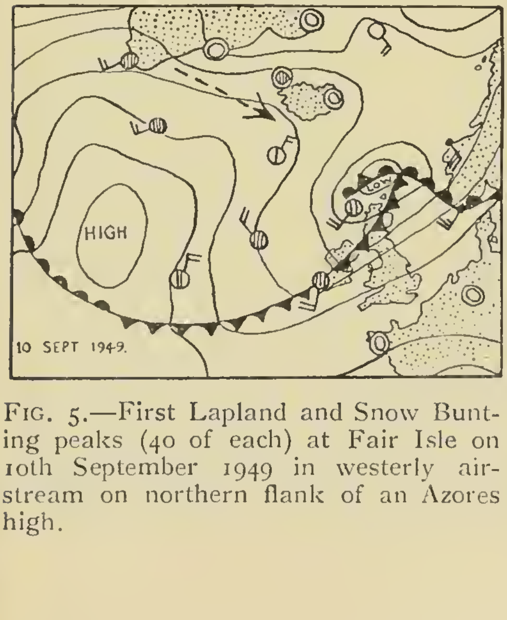


Fig. 5.—First Lapland and Snow Bunting peaks (40 of each) at Fair Isle on 10th September 1949 in westerly airstream on northern flank of an Azores high.

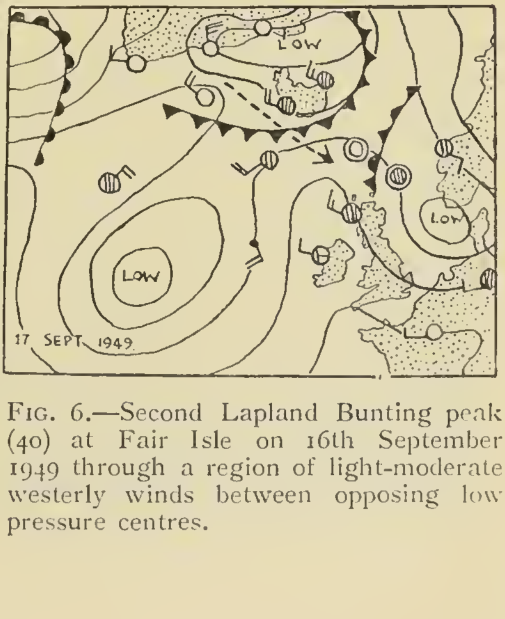


Fig. 6.—Second Lapland Bunting peak (40) at Fair Isle on 16th September 1949 through a region of light-moderate westerly winds between opposing low pressure centres.

At Lundy there had been a single bird on 2nd September, and six or seven were present from the 3rd to the 15th. Weather conditions suggest a cyclonic approach, to the west and south of a complex depression which was moving across the British Isles on the 2nd. This track would not bring birds to the northern part of Britain.

1950.

Passage was very poor at Fair Isle in 1950: after single birds on 1st and 3rd September there were half-a-dozen on the 11th and 26th, and 4 on the 16th and 24th. On the 11th, a White Wagtail peak day, Fair Isle was situated in a light N.W. airstream blowing from Iceland between two low pressure centres; on the 16th, with more wagtail and Meadow Pipit (*Anthus pratensis*) passage, and the first Snow Buntings, winds were cyclonic westerly with a low centred on the Faeroes. The 4 birds of the 24th, with a dozen Snow Buntings, may have come through a col in the same region. The 26th was the only period with a marked north-eastwards expansion of the Azores high, giving a N.W. airstream from Greenland and Iceland, and bringing in addition to both species of bunting the last White Wagtail and 6 Redpolls.

Lundy had only one record in 1950, two birds on 29th September. These may have reached Britain in the same conditions as the Fair Isle birds of 26th September.

Many more Lapland Buntings than usual arrived in Norfolk in this autumn, with a peak of nearly 40 birds at Cley in mid-October (Richardson and Jackson, 1952), which was a period of pronounced easterly weather in the North Sea.

1951.

This was a better season at Fair Isle, with 5 birds on 6th September increasing to a peak of 18 on the 8th, coinciding with White Wagtail passage and arrival of Greenland Wheatears. There was a further peak of the same number on the 15th, but only scattered records afterwards. The first influx had much in common with the initial peak of 1949, an Azorean high being well established to the west of Britain, giving a westerly airflow between Greenland and the northern isles and across Forties to the Norwegian coast. This high moved over Britain to give a west or N.W. airstream at Fair Isle on the next two days, during which Lapland Buntings increased, and a N.E. airstream across the North Sea which carried exclusively Continental drift-migrants to the Isle of May and other east coast bird observatories (Fig. 7). The later peak of 18 coincided with the first Snow Buntings and the arrival of early Greenland White-fronted Geese (*Anser albifrons flavirostris*) at their Irish wintering-grounds and at Fair Isle (Ruttledge and Williamson, 1952). The wind was westerly in the south-western quadrant of a depression which was filling between Iceland and Norway (Fig. 8).

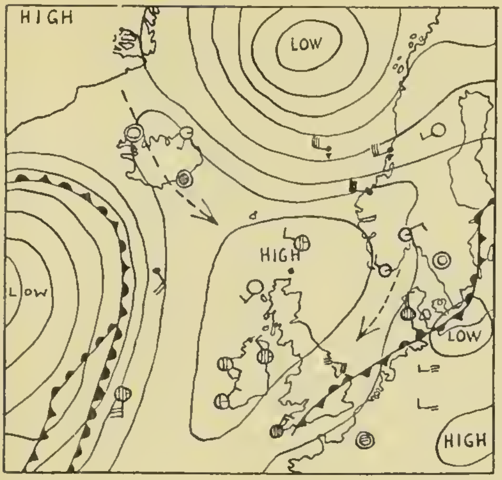


FIG. 7.—First Lapland Bunting influx (18) during 6th-8th September 1951, in light westerly airflow of northern side of an anticyclone covering the British Isles. Simultaneously Continental immigrants were entering along the eastern flank of the high.

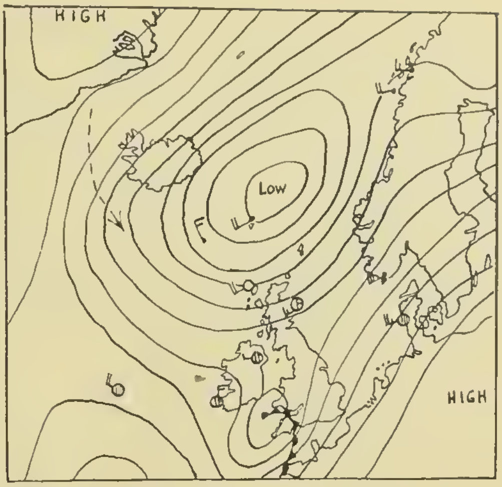


FIG. 8.—Second Lapland Bunting, peak (18) at Fair Isle on 15th September 1951 by cyclonic immigration round a filling low in Faeroes area.

eastern Britain in the N.E. airflow

There was a single bird at Lundy on 25th September, in conditions which did not indicate a recent crossing.

1952.

At Fair Isle 2 birds appeared at the beginning of September, increasing to 7 on the 4th and reaching a peak of 13 on the 6th, during the period of White Wagtail passage; the first Snow Bunting and a Greater Redpoll (*C. f. rostrata*) also arrived. Again the complete weather picture is of a high pressure development in the north-eastern Atlantic, intensifying during the period, and giving N.W. to north winds in the Faeroes and Fair Isle sea-areas, and westerly winds between Greenland and Iceland sometimes extending to the Norwegian coast (Fig. 9). This high became centred on our own area between the 8th and 15th, with a pronounced westerly airstream between Iceland and Norway, and as mentioned later in the section dealing with the species in that country Lapland Buntings were commoner there from the middle of the month than in other recent years. Numbers were small at Fair Isle and after the 14th, when there were 6 in anticyclonic weather, there were only scattered records until one on the 29th was succeeded by 5 next day. These seem likely to have originated in east Greenland, where the weather had been good for several days, travelling via Iceland along the eastern side of a ridge reaching south to Ireland. There were 3 on 5th October with Greenland Redpolls, and 4 on the 7th. (*Scot. Nat.*, vol. 65, pp. 77-78 and figs.)

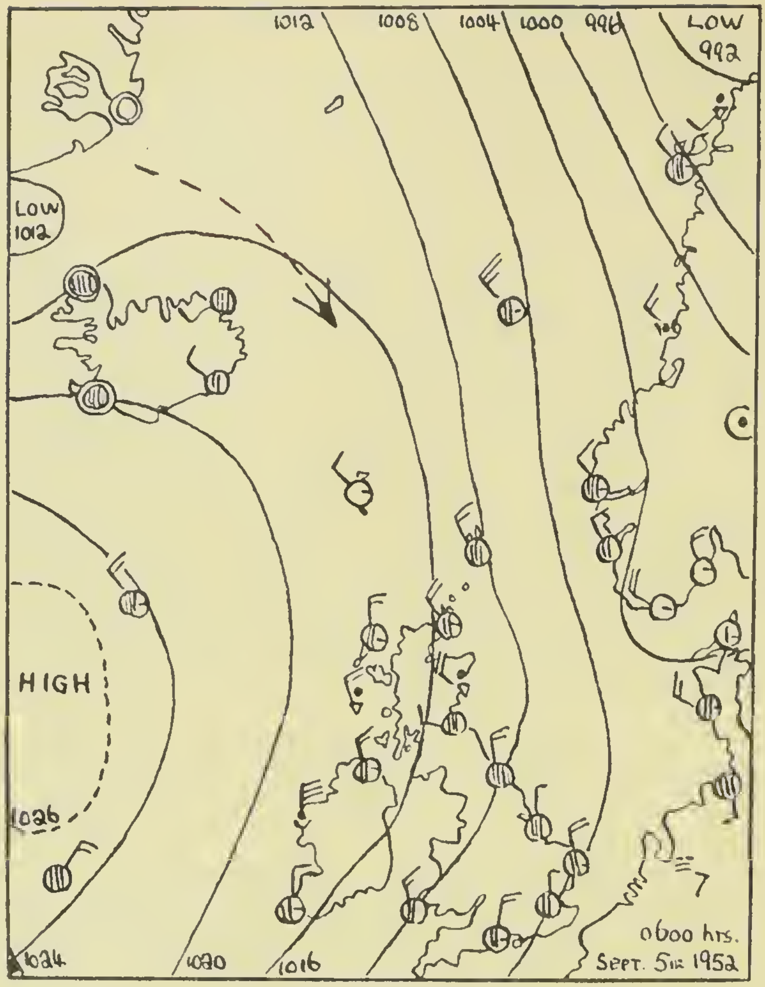


Fig 9.—Lapland Bunting peak (13) at Fair Isle on 6th September 1952 round the north-eastern periphery of an Azores anticyclone.

Two birds flew over Lundy on 17th September, with winds north-west and north around the northern fringes of an anticyclone centred south of Iceland, and along the complementary airstream between this high and a depression centred over Norway. Another bird on 9th October arrived in very similar conditions.

Two other records of single birds at Lundy — on 11th and 13th September—were in easterly weather, suggesting Europe or E. Britain as their immediate source.

CONCLUSIONS

We conclude from this examination that the biggest influxes of Lapland Buntings to the north and west of Britain take place when anticyclonic conditions (usually a north-eastwards extension of the Azores high) become established in the Atlantic Ocean to the west of Ireland, giving a N.W. airflow between south-east Greenland and our own area (for examples, see Figs. 2, 5 and 9). It is probable that a proportion of this immigration takes place via Iceland, and that in periods when the eastwards extension of the anticyclonic system is marked, much of it reaches Norway. There is evidence too that movement sometimes takes place through a col, or through the rather calm area between opposing low pressure centres. Smaller influxes, generally of a more localized nature, occur when a cyclonic westerly airstream covers this region in the south-western quadrant of a depression centred on or near the Faeroe Islands (Figs. 1a, 3 and 8). A low pressure system centred farther south than usual, in Rockall Seas, may divert the stream to south-west England and, conceivably, the Channel coast of France (Fig. 4).

There is no evidence that these big irruptions, either in 1953 or any previous season, have their source in northern Europe, although small numbers of drift-migrants do reach Fair Isle and eastern Britain in easterly weather (see below). The Lapland Bunting movements at Fair Isle are usually accompanied by passage-birds of north-western origin, such as Greenland or "*schiøleri*" Wheatears, Greater Redpolls or White Wagtail peaks.

BIRDS IN SOUTHERN NORWAY

Those who believe that at least a part of the Lapland Bunting influx into Britain is derived from the fells of Norway and Lapland can point to the almost regular occurrence of small numbers of this species in southern Norway as supporting their view. The north European breeding-stock has a south-east migration route, but this does not deny the possibility of small groups reaching the south of Norway by east-wind drift, nor does it exclude the possibility that a small part of the population (from the Dovrefjeld region, perhaps) might have a south-west "preferred direction".

In recent years, with the encouragement and assistance of Dr. H. Holgersen of Stavanger Museum, a Cambridge University expedition has kept annual watch during the autumn migration period at Lista. No Lapland Buntings are mentioned in the 1950 and 1951 reports, nor did Holgersen himself find any on the island of Utsira in the former year. However, a number appeared at both places in 1952 and 1953, and in fact the species was fairly common in the Lista area in mid-September 1952, a few passing S.E. or N.W. over Eigvaag daily from the 10th to the 15th, whilst others were seen at various points along the coast, including 20 together on 20th September (Griffin and Nisbet, 1953). For the 1953 season we have: "A continuous rise in numbers from 2 on 2nd October to over 30 on the 24th, many of them probably on migration", as well as occasional records elsewhere (Swales, 1954).

It appears, therefore, that the Lapland Bunting is somewhat irregular in its appearance and strength in the south-west of Norway. Holgersen observed a few on the island of Utsira in 1952, the year of greatest abundance at Lista, and in discussing the possible origin of these birds he points out that they could well be of north-western stock rather than Norwegian breeders, and that in mid-September the winds were favourable for the arrival of migrants from this quarter. In addition to the Lapland and a few Snow Buntings, a number of Greenland Wheatears and a Hornemann's Redpoll (*Carduelis h. hornemanni*) appeared at Utsira at or following this period. He argues that as very few of the buntings were present during an influx of migrants from the east on 30th September, the Norwegian population "can hardly have begun their passage about mid-September, or they ought to have been more numerous throughout the last half of the month and at least from the 30th". (Holgersen, 1954).

So it is by no means established that the Lapland Buntings which appear as autumn migrants in south-west Norway are Scandinavian birds, and in fact there are good reasons for believing that they are more likely to be birds of Greenland origin brought in by westerly winds after over-shooting the island groups north of Britain. There we must leave the question of their origin pending further investigation, which we have no doubt Dr. Holgersen will make on future visits to Utsira. The next question we must consider is the ultimate destination of these birds, since it is clear they are still on migration at this point and do not over-winter in southern Norway.

If migrational drift brings such birds to Norway in the first place, then drift could also be responsible for taking them out. So many examples of the autumn pattern of bird-movements between the Continent and Britain have been given in contributions to this and other journals that it seems unnecessary to labour the point that in south-west Norway, with the Skagerrak sea-crossing before them, Passerine migrants are particularly exposed to the dangers of deflection over the North Sea by easterly winds. It is not inconceivable that the Utsira and Lista buntings could sustain a drift which would bring them to the British Isles, anywhere from Fair Isle south to Cley. Birds which managed to proceed on their migration without encountering contrary winds might still enter Britain by the short sea-crossing between Holland and East Anglia, and remain to winter in south-east England.

Both Williamson (1953) and Holgerson (1954) have discussed an interesting situation which arose on 25th-26th September 1952 and which brought Snow Buntings and Greenland Wheatears to Fair Isle by cyclonic migration off the west coast of Norway. As mentioned above, Holgersen thinks it improbable that the buntings were Scandinavian birds. No Lapland Buntings were recognized at Fair Isle in this movement, but when a south-east wind-drift developed in the Skagerrak a few days later (29th-30th) 5 appeared at Fair Isle and the species was recorded at the Isle of May. As already mentioned in the discussion of the 1953 movements, it is possible (indeed, probable) that increases in number at Fair Isle on 16th and 19th September were due to arrivals from the south-east in company with Continental species. 1952 was a "good" Lapland Bunting autumn at Cley in Norfolk, up to 10 birds being present from mid-September (*Wild Bird Protection in Norfolk*, 1952), and as this was also a year of plenty in south-west Norway there can be no certainty that the Cley birds belonged to the European stock.

Nevertheless, there can be little doubt that, as suggested by Davis (1954), some at any rate of the East Anglian birds have a European or eastern origin. It is difficult to postulate any other origin for the exceptional 1950 invasion, with about 40 birds at Cley in mid-October—a season when very few were noted at Fair Isle and there were no records from southern Norway. Similarly the small invasion of Lapland Buntings which took place in south-east England in the winter of 1892-93 may have had an eastern source. Although some of the specimens collected at this time are of indeterminate origin (see the section on Taxonomy), at least one has strong eastern affinities.

WEIGHTS OF TRAPPED BIRDS

Some indication of the source of migrant Lapland Buntings might be obtained from a study of their arrival-weights and subsequent recuperation if only there were some way of trapping a sufficiently large sample. If these birds, as seems likely, have to cross a thousand miles or more of the Atlantic to reach Britain, their weight-loss in the course of this journey must be substantial. The only data we have for Passerines regularly migrating from Greenland are for the Wheatear (*Oenanthe oe. leucorrhoa*), which has a normal weight at this season of 30-35 gm. but may fall to as low as 20-23 gm. on migration through Fair Isle (see *Bull. Fair Is. B. Obs.*, vol. 2, pp. 35-37). This is a larger bird than the Lapland Bunting, and although we have no records of " normal weight " in this species we should expect it to be a little over 30 gm. The Snow Bunting, a bird of similar habit but rather longer in the wing, has about the same weight-range as the Greenland Wheatear.

Table I gives details of Lapland Buntings trapped at Fair Isle and Lundy in 1953 (one in 1949). It will be seen that the weights vary between 25 and 30 gm., with two remarkable exceptions. At one end of the scale we have 17.46 gm. and can regard this as near the absolute minimum, since the bird was found dead, apparently from exhaustion. At the other extreme is an unusually big male weighing 40.27 gm. and this must surely be near the upper limit, representing a bird that has been some time recuperating. This example was caught in a Potter Trap baited with turnip seed, on which it had been feeding for some days in the vicinity of the trap. The early arrival of 5th September 1953 appeared to be a tired bird, or unusually tame, since it allowed itself to be shepherded into a clap-net. It was heavily infested on the eye-rims and at the gape with nymphs of the Cattle-Tick (*Ixodes reduvius*), but there is no evidence that such infestation causes loss of weight in other species.

TABLE I—DETAILS OF TRAPPED LAPLAND BUNTINGS (*Calcarius lapponicus*)

Date	Sex	Wing	Bill	Tarsus	Tail	Weight
At Fair Isle						
5.ix.1949	♂	91				29·9
5.ix.1953	♀	89	11	21	62	26.23
16.ix.1953	♀	91	12.5	22	60	25.30
16.ix.1953	♂	94	13	22	66	29.85
28.ix.1953	♀	93	12.5	21	65	17.46
10. x.1953	♂	99	12.5	24	69	40.27
At Lundy			(from feathers)			
2. x.1953	♀ 1st w.	90	10	22	—	25.1
3. x.1953	♂ 1st w.	92	10	21	—	28.1

SPRING MIGRATION

Numbers in spring at Fair Isle are very few. Clarke (1912) knew of only 5 occurrences in as many years, between 25th March (which remains the earliest date) and 2nd May, and before the foundation of the Bird Observatory the only additional records were of single birds on 27th April, 4th-6th May and 18th May (which remains the latest date).

There is certainly a tendency for spring records to be commoner following a good autumn migration. In the spring of 1950, for example, males were present in April on the 5th, 18th-24th (with 3 on the last day), 26th-29th and on 5th May; two females were present on 12th-13th May, one on the 17th and a male and 2 females on the 18th. James A. Stout and James Wilson saw odd birds in April 1954, and there were 4 between 6th and 9th May, whilst C. K. Mylne had one on Foula on the 6th and 5 on the 10th.

Thus, the numbers are so small and its appearance so irregular in the northern isles in spring that we must conclude that the return migration is by a different route, as has been shown to be the case for the Iceland Merlin (*Falco c. subaesalon*) (Williamson), 1954 b). Possibly the bulk of the birds still in this country leave from the Outer Hebrides when outbreaks of polar anticyclonic air establish S.E. winds between Britain and their breeding-grounds, but until some research is done on this problem this opinion must be regarded as conjectural.

TAXONOMY OF THE LAPLAND BUNTING

An alternative method of investigating the area of origin of Lapland Buntings wintering in the British Isles, or passing through on migration, lies in a taxonomic study of the material in museums. The following observations are based on an examination of over 300 specimens from all parts of the range, mostly in the British Museum (Natural History) and the Royal Scottish Museum. We are grateful to Mr. J. D. Macdonald and Dr. A. C. Stephen, respectively in charge of these collections, for access to this material, and also wish to thank Professor V. C. Wynne-Edwards of Aberdeen University and Dr. Finn Salomonsen of Universitetets Zoologiske Museum, Copenhagen, for their kindness in making other specimens available.

The Lapland Bunting has a Holarctic distribution. The type of the species came from Lapland—*Fringilla lapponica* Linnaeus, *Syst. Nat.*, ed. x, i, p. 180 (1758)—so that this must stand as the typical locality of the nominate race.

The palest birds, with prominent buffish-brown fringes to the feathers in the upper-parts and with the black feather-centres least conspicuous, are from eastern Siberia, particularly the Yenesei region and (on migration) China. This pale form is *C. l. coloratus* Ridgeway, *Auk*, 15: 320 (1898), with type-locality Kamchatka. It extends eastwards into Alaska, where it has been given the name *C. l. alascensis* Ridgeway—a form which is poorly defined.

In western Siberia (Petchora region) the birds are somewhat darker, and in north-west Russia and Lapland they are darker still, the fringes of the feathers of upper-parts being a deeper, richer brown and the black centres more prominent. This of course is the typical race *C. l. lapponicus*.

The darkest birds of all in series are those from Greenland and the eastern Canadian Arctic populations. This is *C. l. subcalcaratus* (Brehm). Salomonsen (1951) accepts this race on the grounds that it is darker than the European and has a larger and more robust bill, "with an average difference in bill-length of almost 1.5 mm. and an overlapping of only about 25% of both populations". We think the plumage difference is rather slight and inconstant, and the degree of overlap in bill-length too great to warrant the recognition of *subcalcaratus* as a "good" race. This opinion is based on an analysis of bill-measurements which Mr. Alec Butterfield kindly made for us, and which is given in Table II.

TABLE II—SUMMARY OF BILL-MEASUREMENTS OF LAPLAND BUNTINGS (*Calcarius lapponicus*)

Key: A, Arctic Canada; B, Greenland and Baffin Island; C, Scandinavia east to Petchora; D, Yenesei Valley and China (migrants).

Length of bill from skull in mm.					Length of bill from nostrils in mm.				
Length	A.	B.	C.	D.	Length	A.	B.	C.	D.
11	0	0	5	1	7	0	0	2	2
11.5	0	0	3	2	7.5	0	0	2	3
12	4	1	2	8	8	5	1	24	19
12.5	6	2	8	3	8.5	4	4	8	1
13	5	6	16	11	9	6	6	2	3
13.5	1	6	5	3	9.5	0	0	0	0
14	2	5	7	0	10	0	2	1	0
Average	12.75	13.30	12.76	12.68	Average	8.53	8.85	8.13	8.0

As Mr. Butterfield points out, these figures suggest a two-way cline of decreasing bill-size stemming west and east from Greenland, and with this cline there would appear to be also increasing paleness in the mantle plumage. We have not seen enough material from Arctic Canada and Alaska to be sure that this is so, but it is certainly true in the Palæarctic region. For the purposes of this discussion we therefore use the names *subcalcaratus* (western) and *coloratus* (eastern) as representing the terminal populations on this cline.

It will be readily appreciated that there is some difficulty in separating Greenland from north European birds, either on colour or size of bill, individual variation masking the tendency towards subspecific distinctness. Reasonably certain discrimination is possible only in a minority of cases, on the criterion of an unusually robust bill, so the taxonomic approach to this question of the origin of migrants has not proved as helpful as we had hoped.

Nevertheless, the birds which have been collected in the British Isles show an interesting distribution. Pale birds of undoubted eastern type occur in south-east England; whilst dark birds, many with big bills, occur commonly at Fair Isle and in the Outer Hebrides. The two groups are not exclusive: dark birds (occasionally with big bills) occur in eastern England, and at least one pale example is known from Fair Isle.

Three birds in the British Museum collection match very closely two autumn migrants from the Gobi Desert, and are from the *coloratus* end of the cline: ♀, Cambridge, 15. xii. 1892; ♂ and ♀, Thorpe Mere, 10. x. 1911. Others not quite so pale but still showing a decided affinity with eastern birds are: ♂ and ♀, Thorpe Mere, 6. xi. 1915; ♀, Aldringham, Suffolk, 9. xi. 1915; ♂ and 2 ♀ ♀, Cley, Norfolk, x. and xi. 1923; and ♀, Fair Isle, 23, ix. 1905.

The last of these is very unexpected, as other 1905 birds from Fair Isle suggest affinity with *subcalcaratus*. There are a number of dark but indeterminate specimens of western origin from Thorpe Mere, Cley, North Cotes in Lincolnshire, Berwick-on-Tweed and Fair Isle. There is a long series of dark, heavy-billed birds in the Royal Scottish Museum from Fair Isle, the Flannans and St. Kilda: these are at or near the *subcalcaratus* end of the cline, and they can be matched by similar individuals from Cley, Blakeney, Great Yarmouth, Wellshill, Lowestoft and North Cotes in eastern England, and abroad from Heligoland, Iceland and Jan Mayen.

We may summarize by saying that the preponderance of dark, big-billed birds at Fair Isle, Flannans and St. Kilda is consistent with the view founded on our interpretation of the meteorological data that the bulk of the passage into Britain is drawn from Greenland. On the other hand, it is clear that birds originating near the *coloratus* (eastern) end of the cline appear in autumn and winter in south-east England (and may even reach Fair Isle), whilst in all parts there are frequent records of dark birds of indeterminate western origin.

CAUSE OF THE INVASION OF 1953

At first sight it appeared likely that the unusual abundance of Lapland Buntings in September 1953 might be due to weather factors deflecting a considerable part of the America-bound migration into the eastern Atlantic. It seemed important, therefore, to extend the scope of this inquiry by seeking information on the winter status of the Lapland Bunting in the United States in 1953-54. Low wintering numbers would suggest that unusual circumstances, probably meteorological, had caused a wholesale shift of the population from its usual winter home to another some 4,000 miles away. On the other hand, a high wintering stock would indicate some biological cause for their abundance, and pose quite a different kind of problem.

A request to Dr. Albert Wolfson was kindly passed, through Mr. John Baker, the president of the National Audubon Society, to Dr. Chandler S. Robbins of the United States Department of the Interior Fish and Wildlife Service. We are grateful to Dr. Robbins for his trouble in compiling a detailed and interesting report, which we think it worth while reproducing *in extenso* below:

"No significant counts of this species were reported to us until the end of December, when the annual Christmas Bird Count was conducted. . . . Unfortunately, relatively few of our counts come from the area in which the Lapland Longspur winters in the greatest abundance. Furthermore, even within this area, many localities are covered only occasionally; therefore it is very difficult to get much significance from the changes in counts from year to year. The following figures are presented for what they may be worth.

"In 1949 a total of 580 Lapland Longspurs were recorded during the week of the Christmas counts in U.S. and Canada. The locality reporting the greatest number was East St. Louis (Illinois) with 250. In 1950 the total was 2,680 of which 950 were noted at Sanborn (Iowa), the highest locality count. In 1951 the grand total was 2,032 and the highest single count 608 at Lawrence (Kansas). In 1952 the total was 1,790 and the highest count 300 at Valentine (Nebraska).

"In 1953 the total number of Lapland Longspurs recorded was 8,732, which is quite likely the largest ever recorded in these counts. . . . The highest single count was 3,000 at Camp Chaffee (Arkansas). There has been an annual increase in coverage which must be taken into account in comparing the year to year totals; in 1953, for instance, there were 18,769 party-hours reported for the entire Continent as compared with 15,600 in the previous year. The two areas that had the highest counts in 1953—Camp Chaffee with 3,000 and Olathe (Kansas) with 1,500—were unfortunately not covered in the preceding years. However, in glancing over the reports I noticed that several of the areas which report every year had exceptionally high counts in 1953. These include Lonoke (Arkansas) with 1,083, and Des Lacs Refuge (North Dakota) with 613. The high counts in these areas and the large number of localities which reported Lapland Longspurs this year suggest that there was an actual increase in abundance of this species in the central United States this winter."

Thus it would appear that the great invasion of the British Isles in 1953 was not due to special weather conditions in the Atlantic, causing a diversion of a part of the Greenland population from its route to America, but to a general increase in numbers over at least the greater part of the bird's Nearctic range. It is remarkable that this increase, presumably the result of an unusually successful breeding-season, should have a parallel in the Old World in a similar marked rise in numbers of other northern birds. The most remarkable manifestation of this, of course, was the "irruption" of Crossbills (*Loxia curvirostra*) into western Europe from June onwards to September, and in addition the autumn migration of waders, Siskins (*Carduelis spinus*), Coal Tits (*Parus ater*), Kestrels (*Falco tinnunculus*) and Fieldfares (*Turdus pilaris*) was abnormally strong (Williamson, 1954 a and c). Why several northern species of diverse habits should show this increase, whilst others occupying the same region apparently remained stable, is a problem to which there seems to be no simple solution. The greater fecundity must surely be due to a greater food-supply, leading to a higher survival-rate among the young and, perhaps, a greater proportion of double broods.

In northern Europe during June and July 1953 the weather was dominated by a polar anticyclone of an intensity and stability which is rare in these latitudes in the summer months. Such conditions would promote a higher fertility in plant and insect life, and the autumn abundance of certain birds may be a direct result. The situation in the case of the Crossbill, an early breeder, is more complex, but we believe a connection with the polar anticyclonic weather can be established (Williamson, 1954 e). Late in June this high extended to Greenland, though temperatures were not above the mid-forties, except at some stations late in the month, and there were periods of anticyclonic weather there and in the east Canadian arctic in early July and again in the first part of August. The Nearctic region, however, did not enjoy anything like the same settled conditions and high temperatures as were present in north-eastern Europe, and there seems no obvious reason why Lapland Buntings should have reached an optimum in this part of the world in 1953.

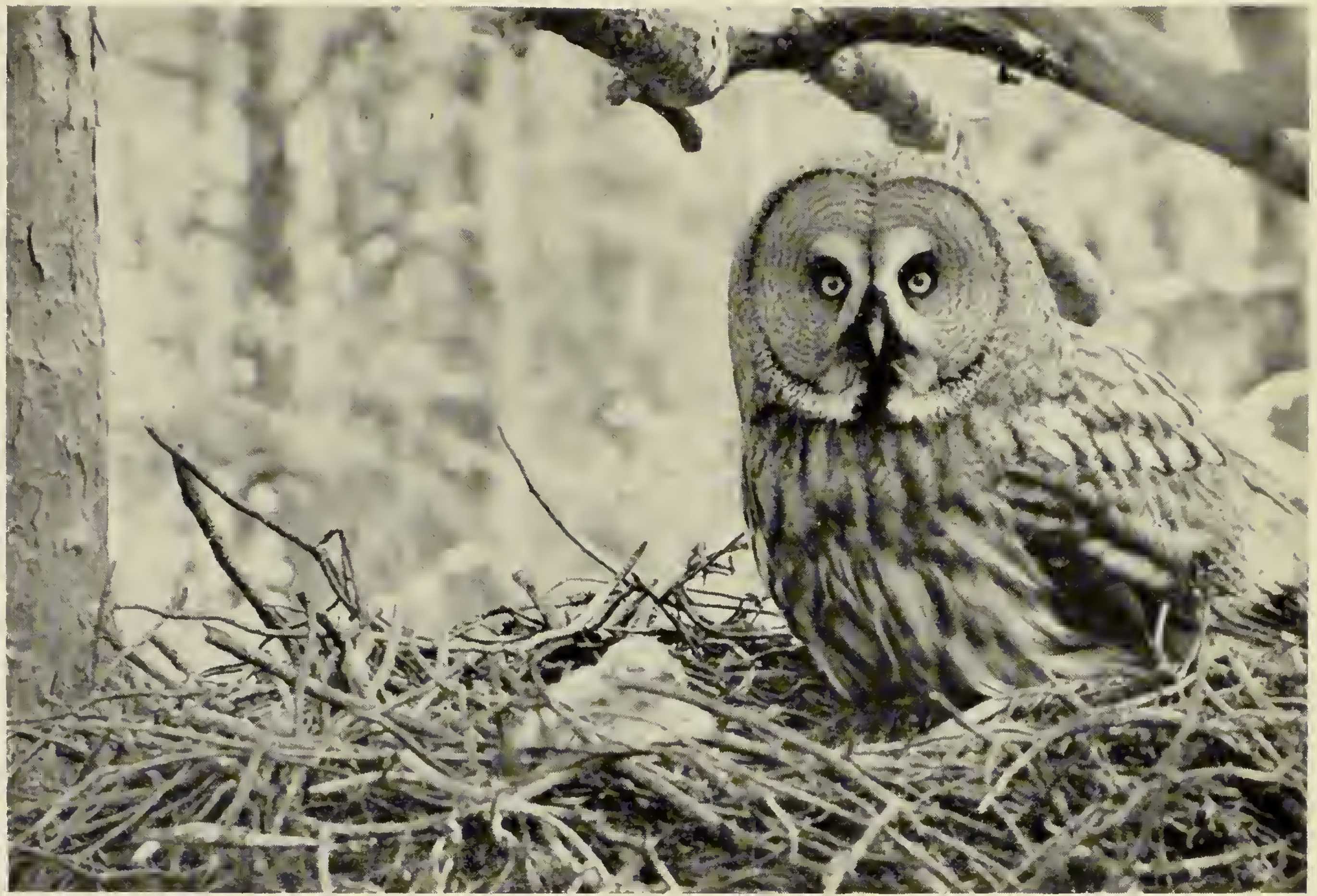
SUMMARY

1. An unprecedentedly big invasion of Lapland Buntings (*Calcarius lapponicus*) into Britain in September 1953 is studied with a view to determining its source.

2. Reports of the species in the British Isles in autumn and winter 1953-54 are summarized.

3. The meteorological environment of the invasion is examined with the help of *The Daily Weather Report* and the authors conclude that the several movements, as well as others recorded in the north and west in previous years, were composed almost entirely of Greenland birds.

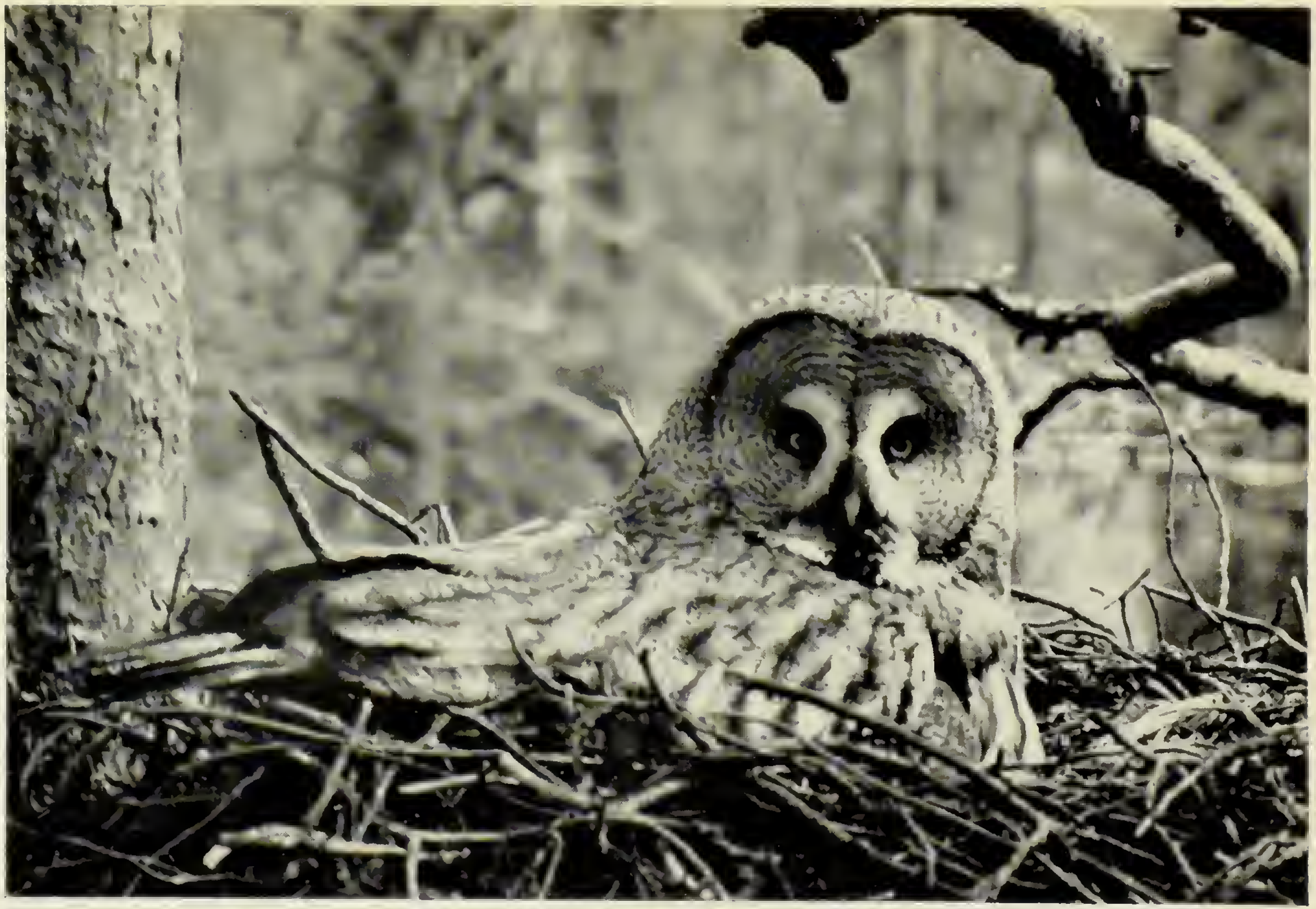
4. The biggest influxes occur under conditions of anticyclonic development in the north-east Atlantic, with a westerly airstream between south-eastern Greenland and the British Isles. Smaller and usually more localized influxes occur in cyclonic weather, with a low centred on or near Iceland or Faeroe and a backing airstream, N.W.-S.W., between Greenland and Britain. The move-



Oscar Moberg

FEMALE GREAT GREY OWL (*Strix nebulosa*): SWEDEN 1955

This shows very well the bird's strikingly rounded head and the large facial discs which are different from those of the Ural Owl (*S. uralensis*) in being clearly marked with a series of circles. Note the white curves formed by the elongated inner feathers of the facial discs and contrasting with the black bib (see page 26).

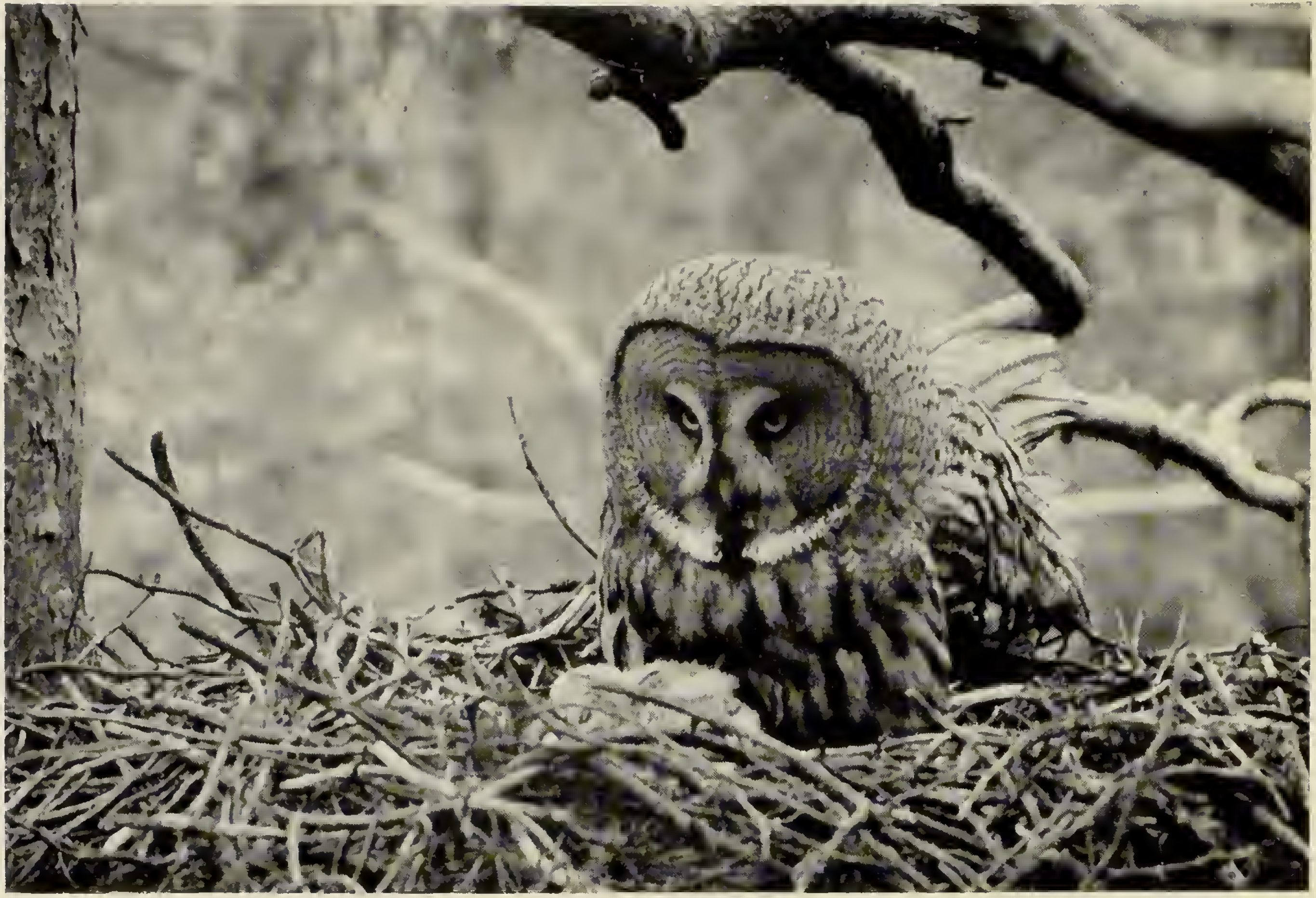


Oscar Moberg

FEMALE GREAT GREY OWL (*Strix nebulosa*): SWEDEN 1955

This owl is much greyer than the Eagle Owl (*Bubo bubo*) and the Ural Owl (*S. uralensis*), between which it comes in size. Above, this colour is boldly marked with blackish-brown and white. Like the Ural Owl this bird has a long tail, which can be seen here.

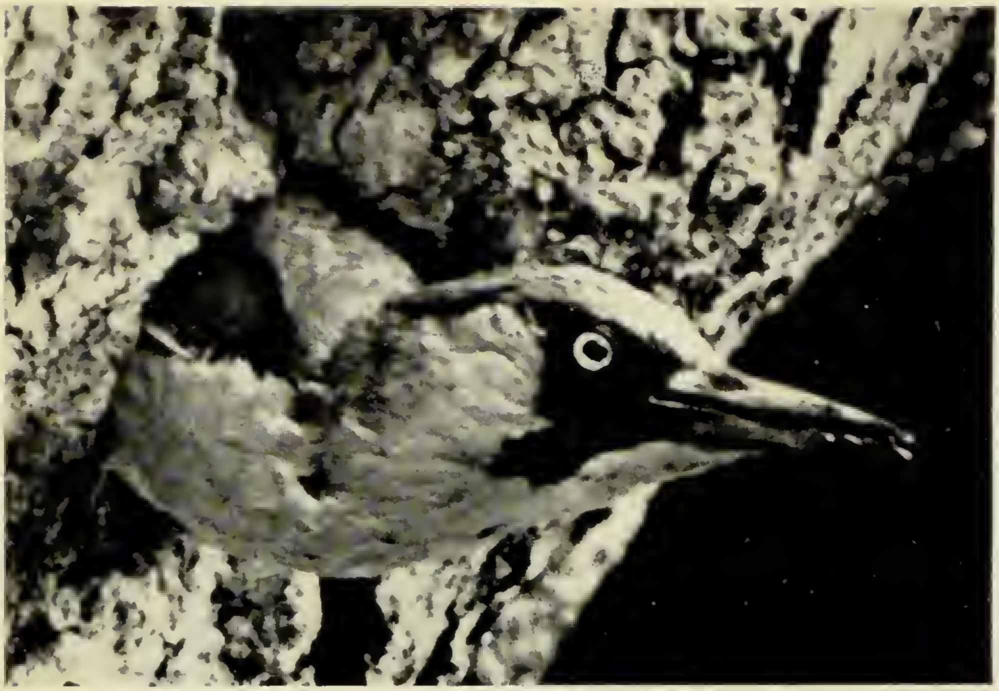
PLATE 3



Oscar Moberg

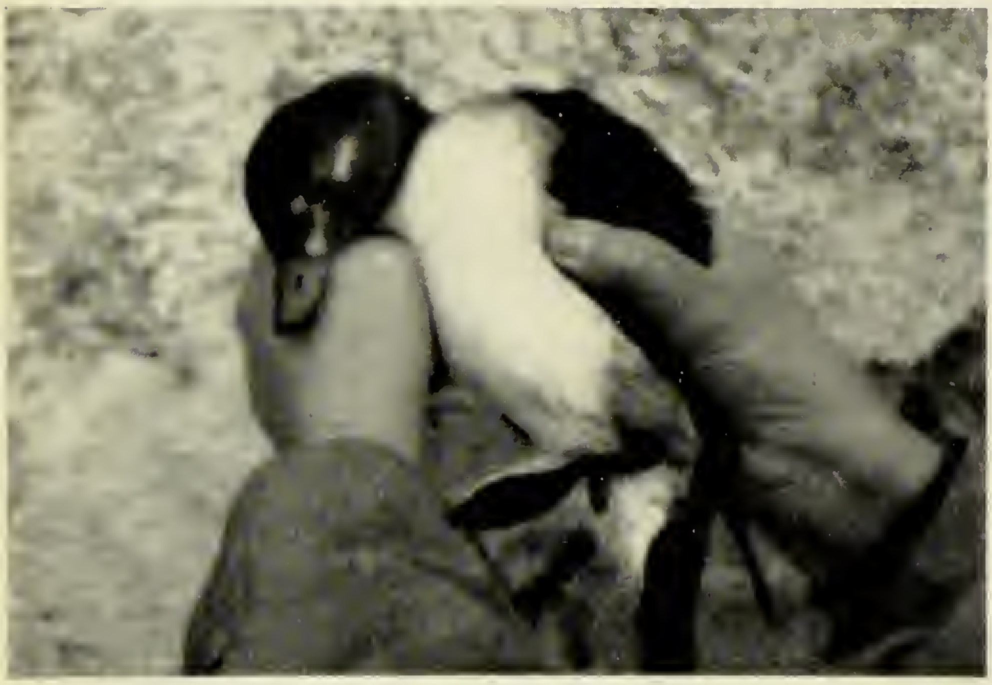
FEMALE GREAT GREY OWL (*Strix nebulosa*): SWEDEN 1955
The under-parts are streaked with dark brown on a background of faint barring which can just be seen in this plate. The eyes, unlike those of the Ural Owl, are yellow. This pair of owls were breeding in a typical site—the disused nest of one of the larger birds of prey (see page 27).

Plate 4



A. McCormick

Male Green Woodpecker (*Picus viridis*)
showing faecal matter between the mandibles
See " Nest-sanitation and fledging of the Green Woodpecker " (page 33).



Maeve Rusk

Female Harlequin Duck (*Histrionicus histrionicus*)
Shetland, October 1955
The short, rather delicate bill and the pattern of three spots on the head, two in front of the eye and one behind, are clearly shown. The bird was otherwise largely brown above and white below (see page 36).

ments thus provide further support for the theory of down-wind drift.

5. Small numbers reach Fair Isle from the Continent under conditions of S.E. wind in the Skagerrak and North Sea: it is suggested that these, and the birds appearing irregularly in southern Norway, are more likely to be Greenland migrants which have previously drifted to Norway than north European breeding-birds.

6. There is evidence that at least some of the birds partially wintering in East Anglia are derived from Palaearctic breeding-stocks.

7. Spring migrants are rare at Fair Isle and Lundy and the return migration must follow a different, at present unknown, route.

8. A taxonomic study suggests the existence of a two-way cline of decreasing bill-size and paler coloration stemming eastwards and probably also westwards from Greenland. British-taken specimens reveal a preponderance of dark, heavy-billed birds (*C. l. subcalcaratus*) in the northern isles, and a mixture of pale eastern (*C. l. coloratus*) and indeterminate dark birds, with a few of *subcalcaratus* type, in eastern England, thus supporting the conclusions reached from a synoptic study of the migration.

9. There is evidence that, as the species was unusually abundant in the United States in winter 1953-54, the Lapland Bunting population in the Nearctic reached an optimum in autumn 1953. The cause of this abnormal abundance is not known.

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PHOTOGRAPHIC STUDIES OF SOME LESS FAMILIAR BIRDS

LXIX. GREAT GREY OWL

Photographed by OSCAR MOBERG

(Plates 1-3)

Though the Great Grey, or Lapland, Owl (*Strix nebulosa*) has never been recorded in Britain, we feel more than justified in publishing these magnificent photographs which we have received through Mr. Moberg's friend and companion, Kapten Sven Wahlberg, for they are probably the first to be taken of this species at the nest, at least in Europe.

This owl breeds from Arctic Norway, Sweden and Finland right across Siberia to Sakhalin, Yakutsk and the mainland north of the Kamchatka, according to G.P. Dementiev in *The Birds of the Soviet Union;* also in parts of the North American continent, chiefly in the north-western quarter. In Siberia it is largely confined to a strip 500 to 1,000 miles in width, mainly between latitude 50° N. and the Arctic circle. Over much of its range it is resident, though locally it is migratory, and in North America there is a definite movement south in winter. Like some other owls, it is subject to years of "irruption," and then in Europe its range extends over much of the rest of Scandinavia and Finland.

The Great Grey is a very large owl, larger than the Ural (*S. uralensis*) and approximating in size to the Eagle Owl (*Bubo bubo*), though it has none of the bulk of this last species. According to the summary of information given by J. B. Szczepski in *Pomocnicze Tabele Ornitologiczne* (pp. 54-57) the two species have roughly the same total length and wing length, but whereas male Eagle Owls weigh between 2,100 and 3,000 gm. and females even up to 3,260 gm., the Great Grey is more comparable to the Ural Owl, males weighing chiefly between 700 and 800 gm. and females up to 1,200 gm. It is much greyer than the Eagle Owl, boldly marked with blackish-brown and white above, and with dark brown streakings below on a background of faint barring, that can just be seen in plates 1 and 3. These photographs show the bird's strikingly rounded head, with large facial discs which are different from those of the Ural Owl in being heavily traced with circles. Against these the white curves between the eyes stand out in contrast with the black patch on the chin. The eyes are yellow, unlike the blackish irides of the Ural Owl (*cf.* vol. xlvi, plates 63-67), but like those of that species, they are small, far smaller than those of the related Tawny Owl (*S. aluco*) which is the only representative of the genus in Britain. The figures given by Szczepski show that the diameter of the eye is only 12.5 mm. as against 16-17 mm. in the Tawny.

The Great Grey Owl breeds in thick, coniferous forests of the north, in the disused eyries of large birds of prey, there again differing from the related Tawny and Ural Owls which prefer cavities in trees. Kapten Wahlberg informs us that the nest shown in these photographs was found in Sweden 40 miles north of the Arctic Circle at a place near the Finnish border. He goes on to say—" The nest was situated in a forest with a few big pines left standing amongst a lot of young spruce, birch and aspen trees and because of this the wood was quite dense. In one of the pines there was an old bird of prey's nest, goshawk or buzzard, which had been taken over by the owl. Immediately we came there we saw her sitting in the nest; she was still and quiet and watched us, following all our moves by turning her big concave face with its nine circles towards us. She was very calm and left the nest only a few times whilst we were there. We began to work with our hide some hundred yards away and even when we raised our ladder against a tree seven yards from the nesting tree she did not move. Now and then she took care of her only chick just like an old hen and she had a chuckling voice too. All the pictures were then taken from the hide eight yards above the ground in a neighbouring tree. When she flew with slow lissom strokes between the trees, I thought it very curious that she did not collide somewhere. This is a bird as big as a male Golden Eagle (*Aquila chrysaëtos*), and it was quite amazing to see her flying low in that rather thick wood. Six times we heard a curious noise in the distance ' boooooh, boooooh, boooooh.' The hen answered from the nest with her chuckling or you may call it ' a little dog barking ' noise. Ten seconds later the male bird came. He was smaller and had to work hard as the food was scarce and they managed to rear only one young. In twenty-four hours he came with prey only six times, five times with a water vole and the sixth with some other rodent."

Szczepski gives the normal clutch as 4-6 eggs, occasionally 7, though in years when food is plentiful as many as 9 eggs have been recorded. As with some other owls, its clutch size, numbers and breeding range are very much affected by the lemming plagues. Apart from these mammals its food, according to O. Uttendörfer (*Die Ernährung der Greifvogel und Eulen*, p. 132) consists of voles, squirrels, and small and medium-sized birds. Most of the hunting is done by day, hence the very much smaller eyes than the largely nocturnal Tawny Owl. A. C. Bent (*Life Histories of Some North American Birds of Prey,* Part II) gives the chief prey as bush rabbits, young hares, squirrels, rats, lemmings, shrews, mice and small birds.

I.J.F.-L.

A RAVEN ROOST IN DEVON

By H. G. Hurrell

At least one large roost of Ravens (*Corvus corax*) has been reported in Scotland and another in Wales. In W. Cornwall there was one in 1945 and 1946 near an abnormally liberal food supply. In October the number of Ravens using this roost was between 100 and 150. By early February there were less than 50 and by March the maximum counted was 16. From time to time Raven roosts have doubtless occurred in Devon, yet so far as I can trace, none has hitherto been recorded. In the nature of things such roosts must be few and far between and this makes it all the more remarkable that I should be able to observe the establishment of one almost on my doorstep.

My house is situated at 650 ft. on the southern fringe of Dartmoor with an extensive view across S. Devon farmland. Between the house and the moor is a 5-acre wood. During the past 5 years a pair of Ravens have visited this wood from time to time, although their nesting tree was about a mile away. For some reason they have not reared any young and each year after their failure they frequented our wood for several days. They would repair and then abandon a nest in a Scots pine about 100 yds. from the house. About a month before Christmas 1954 they began roosting in our wood, generally selecting for the purpose a deciduous tree near the nest.

One winter morning I saw eight Ravens fly overhead into the moor. This was a few minutes before our local pair had left the tree in which they had roosted. That evening our wood was without Ravens, for the local pair had gone elsewhere. Four days later, however, on 17th January 1955, *two* pairs of Ravens settled amicably in our wood. This was remarkable behaviour, because hitherto the local pair had always driven off intruders with the greatest fury. So I concluded that these four birds were strangers.

Later the same day, during a walk on the moor, I came across a large concourse of Ravens attracted by the carcasses of 5 sheep which had died in an exceptionally big snowdrift. They flew off at my approach and blackened a stretch of moorland like rooks when they pitched. I estimated that there were at least 50. Soon several of them engaged in a display on the ground which I watched through my binoculars. Some half-a-dozen birds, which were evidently females scattered here and there in this flock, had in attendance one, two or three birds, which, from their rather larger size and their behaviour, must have been males. These males puffed out their feathers, especially those of the throat and neck, and stretched up to their maximum height beside the nearest female. While holding this attitude they would follow the female, if she walked away, by progressing in greatly exaggerated, stiff-legged hops. I believe the Ravens came to this feast for several days from a distant roost. Then on 21st January I was delighted to find that 8 or 10 Ravens had roosted in the wood close to my house. On the 24th the headlights of the car unfortunately disturbed several which were roosting almost over the house. From now on all lights were switched off when going up the drive after dark. The number had reached at least a score by 25th January and about 50 by the end of the month. The nest in the Scots pine was torn out by the invading Ravens so that not a stick of it remained.

The roost continued at its full strength of between 50 and 60 for a couple of months. Only twice before during a lifetime in Devon (on 23rd April 1936 and 26th April 1941) have I seen such a number together. The continued presence of such an exceptionally large number was evidently made possible by two circumstances which provided an unusual supply of food. Many sheep had died on the moor in the hard weather and myxomatosis was rampant. I examined scores of castings and most of them contained sheep wool and/or rabbit fur. Several times I came across Ravens feeding on rabbit carcasses. Another important item in their diet is still rather a puzzle. Flakes of a tough, but pliable, white substance were often present in the castings. Some castings consisted entirely of pieces of this substance. At first I thought it must be cartilage or tendon, though the quantity seemed excessive for this. Microscopic examination of a flake showed black lines branching in all directions. Mr. O. D. Hunt ascertained that it was a vegetable substance, though what kind of plant remains a mystery. I found considerable quantities of the same material, but in slightly smaller flakes, in the castings of Carrion Crows (*Corvus corone*) under a large crow roost.

The availability of food doubtless explains why so many Ravens were able to remain in the district, but it does not explain why they chose to use our wood. Many similar woods are to be found within easy reach, though it would be difficult to find one with so extensive a view. Whether or not this would appeal to Ravens I cannot say. I have a suspicion that our pair may have unwittingly interested others in the wood where they were in the habit of roosting, but this is only a suspicion.

The procedure each evening was for the birds to arrive from various directions in ones, twos or small parties. They would assemble on the high moorland behind the roost. Sometimes they would sit quietly on the ground. Often they would take flight and engage in remarkable aerobatics. They would chase each other closely, often making vicious dives. It appeared to be a recognised kind of horseplay. Just occasionally there would be a really angry chase when one Raven appeared to be out for another's blood. They would make two or three visits to the wood and back to the moorland before they finally settled down in the trees to roost. In our mixed wood there seemed to be a preference for roosting in deciduous trees such as beech, ash, chestnut or oak, rather than in Scots pines which were also available. When at roost the Ravens were concentrated in a small portion only of the 5-acre wood. It was noted that two Ravens would often roost near each other. There would be many such couples. A favoured tree might hold between a dozen and a score of Ravens. At times they made a lot of noise. They possess a considerable range of calls, many of which Mr. Tony Soper recorded for the B.B.C. on 5th February.

The roost continued at its full strength of between 50 and 60 throughout February and for a part of March. On 19th March a party of seven Ravens circled high at roosting time and made off westwards. There was a rapid diminution in the number using our roost during the following week and it was later established that they had gone to Piles Copse, one of the three ancient oakwoods of Dartmoor. It is a small wood, only a few acres in extent, situated in a deep moorland valley 3 miles west of our wood. The trees are gnarled and twisted oaks only 30 ft. or so in height. The view from the wood itself is somewhat restricted, but wide sweeps are to be seen from the hills above. Piles Copse has its own pair of roosting and nesting Ravens.

On 11th April (Easter Monday) I obtained the maximum count of 86 using our roost. Without a doubt these Ravens had been disturbed from Piles Copse by campers who lit fires there during the Easter week-end. The Ravens went back to Piles Copse after a few nights in our wood and by the end of April, when I visited Piles, I estimated that 80 or more were roosting there. During the months of May and June the roost continued at Piles, though numbers diminished considerably. There were Ravens about during August and up to 40 were reported together on the moor, but it seems likely that they were making use of yet another roost. By mid-September I found only the local pair roosting at Piles. There have been no Ravens roosting regularly in our wood since they transferred to Piles. It may be mentioned that our local pair built a new nest about a mile away in 1955, but, as usual, it did not succeed.

The most remarkable find beneath our roost was the complete nest of a dormouse. It was lying in the open on the floor of the wood immediately beneath the branches of a tree in which several Ravens were roosting. Circumstantial evidence suggests that it had been dropped 60/70 feet from the tree-top. I was surprised to find inside the nest a dormouse, still hibernating. I have kept the dormouse and it is still alive and well at the time of writing, ten months afterwards.

On 5th March, on the floor of our wood immediately below the roost, I found a dead Raven. It had been severely pecked on the rump, wings and head. This may well have been the cause of death, especially as a post mortem showed no other likely explanation. It was a female in non-breeding condition. There was no enlargement of the ovaries. From the appearance of the throat feathers I suspect she was a bird of the previous year. Another dead Raven which I picked up on the hillside above the wood on 13th April was also a female in non-breeding condition. She appeared to have been shot. Yet another Raven was found on 23rd April on the slopes above Piles Copse. This was a male which had been dead for a week or two (cause not ascertained). The two earlier examples suggest that large roosts may be composed of non-breeding birds, at any rate during the nesting-season. I have often noted, too, that breeding Ravens roost near their nests in the breeding-season. There were a few birds in the roost which were extremely ragged and seemed to be moulting heavily. Possibly these could be very old birds or ones which were two or more years old and still without the opportunity of breeding. It is unlikely that yearlings would be moulting in winter.

An interesting result of the establishment of a Raven roost in our wood was the fact that it attracted Jackdaws (*Corvus monedula*) which were on their way to their usual roost a mile or so away. The Jackdaws would pitch in trees near the Ravens. Then they would fly some distance towards their own roost, but turn back to spend a few moments longer with the Ravens. This might be repeated several times. Eventually, for several nights a number of Jackdaws remained in the wood and roosted with the Ravens. To the best of my knowledge they have never on any occasion roosted in the wood except when the Ravens were there although they fly past the wood each evening. An interesting example of one species influencing the roosting locality of another.

It is my contention that in Devon the most suitable feeding areas for Ravens, such as the moors, are to a large extent territorially divided between a number of pairs. This means that, if non-breeding Ravens fed and roosted singly, especially in the breeding season, they might be vehemently driven from one territory to another. When, however, a whole host of Ravens arrive, as in our case, it is clearly impossible for the local pair to rout them. This seems to point to an advantage for non-breeders in feeding and roosting collectively.

SUMMARY

The establishment of a Raven roost in Devon in January 1955 is described. It coincided with an exceptional food supply through large snow-drifts trapping a number of sheep and through the incidence of myxomatosis. Two dead Ravens were examined and found to be in non-breeding condition. One of the advantages of collective feeding and roosting is suggested.

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NEST-SANITATION AND FLEDGING OF THE GREEN WOODPECKER

By H. R. Tutt

There is considerable conflict in the accounts of nest-sanitation by the Green Woodpecker (*Picus viridis*). Owen (1921) writes: "From nests I have opened from time to time after the young have flown, it seems that generally the nest is kept in a very clean condition by the old birds, chiefly by the female. The dung must be swallowed in the hole, as we never saw a bird carry any away." On the other hand, a statement by Løppenthin (1932) mentions a Green Woodpecker's hole "cut into a rotten beech about 5 m. from the ground. On July 9th, 1928, this nest contained a feathered young bird and a layer of excrement about 10 cm. high". Owen's account was the result of work by a team of schoolboys led by him, and he informs me he has lost his notes, but from memory says one hole was cut open after a stoat took the young from it; "others were opened at various periods after the young had left, usually by woodmen". Løppenthin broke open the nest-hole when he found it. The two statements appear contradictory, but, except in one case, the data concerning Owen's nests are, in the absence of his notes, too uncertain for comparisons to be made.

There is another account, given by Blair and Tucker (1941), quoting the observations of A. H. M. Cox and M. Moon, "Faeces carried after ninth day; parent did not enter hole; may have taken direct. Faeces mixed with wood-dust carried, but more often swallowed inside hole, parent emerging with soiled beak". The second and last of these statements are contradictory, unless the second refers to only one visit by one adult, which I think it must do. The first statement also conflicts with the last by Owen. No details are given of the tree, the position of the nest-hole, the distance at which the observations were made, nor details of how wood-dust was recognized on a faecal sac. Of the many nests I have examined there has been wood dust in one only; all the others have had soft wood interiors but no dust.

With regard to the "soiled beak", I have seen, as Owen did, wet clay on the upper mandible; I have also frequently seen the paste-like food adhering to the adult's bill immediately this is withdrawn from that of the young. Usually the long tongue is whipped out, and curved back over the bill to retrieve food (see Tutt, 1950). The food paste might be easily mistaken for excreta.

I have studied nest-holes in fruit-trees at heights varying from 2 ft. 6 in. to 5 ft. 6 in. above ground level, using a hide whose front was 6 feet from the nest-hole. The hide was usually placed so that the bird was seen sideways as it entered or left the hole; at one nest, however, it was placed directly in front, so that the observer could look through the hole to the interior. The pattern of behaviour has been similar with all the pairs, but much greater detail could be seen from the hide facing the front of the nest. This hole was 3 ft. 6 in. high in a plum tree; the interior was a natural cavity going far above the entrance hole and with very fine dust at the base.

Often the adult emerges like a rocket and it is then not possible to see the bill clearly; at other times, however, there is a distinct pause. When emerging from the hole in the plum tree, both parents were forced to pause owing to the struggle both, but more especially the female, had to push through. This hole had a horizontal axis of 5 cm. and vertical 5.2 cm., the smallest of all the holes measured. The female seemed to realize the tightness of the hole, for once, when returning to feed, she chiselled at the side of it for nine minutes, the wood being so tough she had to take each chip and lever and pull till the fibres broke.

There are three phases in the fledging period each merging into the succeeding one and varying slightly with the different pairs. The first lasts 12-14 days during which time the adult enters the hole, so that feeding and sanitation are carried out hidden from view, except when the hide is directly in front. The second lasts 4-5 days and in this phase regurgitation takes place outside, after which some or all of the chicks are fed through the hole before the adult enters. The final phase, 3-4 days, commences when the female pushes her way through the young into the hole for the last time; the male continues to enter for another day, or day and a half, and then he also ceases to go inside.

During the first phase the parent usually leaves the hole with the beak closed in a normal manner. Only once at 13-14 days have I seen what must have been faeces: the bird emerged with the mandibles slightly apart and a white streak was visible projecting just outside and along their edges. When the light was in the right direction I was able to see the adult inside the hole in the plum tree. I watched it regurgitate, its head being framed in the entrance; each regurgitation was followed by its lowering its head to feed. The bird was obviously clinging to the sides of the cavity for the bottom was 15-16 inches from the lowest point in the rim of the entrance. Feeding over, the bird's head disappeared for from one to two minutes before it emerged from the hole. The pause every time an adult left this nest enabled careful observation of the beak; in the last day or two of this first period the mandibles were occasionally opening and shutting as the bird came from the hole. The bills of the young could be seen inside the hole and their forward toes on the lip of the entrance at 13/14 days.

During the second phase the adult sometimes emerged opening and shutting the mandibles as it was thrusting the head through the hole and then made a swallowing action; sometimes the bill was closed normally, but far more often the mandibles were slightly apart. The photograph by A. McCormick (plate 4a), taken in side view at another hole, shows the male leaving in this way; the faecal matter is visible between the mandibles, but not so clearly as I have observed it on many occasions; I have seen two and three distinct lumps inside the bill between the mandibles, which may be held more widely apart according to the amount of faecal matter carried. Only once have I seen a complete faecal sac: the male emerged dangling one from the tip of the bill at 17/18 days. the excreta must be dropped, but I have never been able to see this from the hide.

I have not seen any indication that direct taking of sacs occurs at the hole: in a normal cavity the young would have to invert for this purpose. I have never seen an adult Green Woodpecker clinging upside down and I cannot believe a chick would cling in this manner. There was room to climb the cavity in the plum tree but I never saw a youngster go above the entrance hole.

The third phase produces a marked change in the behaviour: sanitation is continued by one bird only for about a day and a half and then ceases altogether. Feeding (see Tutt, 1950) is now erratic. I have seen the female regurgitate from nine to thirteen times successively during this period; she gives food to one chick three or four times, places her closed bill into its open mandibles and pushes it away to allow another to come to the hole, but not all the chicks get food at a single visit. In the last two days, the male will come and feed a single chick once or twice, jerk his way up the nest tree, or fly to a neighbouring one, calling "weet, weet, weet . . .", or uttering a soft but peculiarly sweet yaffle, repeated at intervals. The female calls like the male but far less often. First one chick and then another (each trying to hold the place as long as possible) thrusts out the head to the fullest extent and gives vent to loud squawking interspersed by two or three strident yaffle notes. The chicks are obviously hungry and though not left without food get less than usual. When an adult arrives the chick whose head is out shows the most intense excitement, and when after feeding it once or twice the adult stops regurgitating the youngster lunges out at the parent's throat with such force that the latter jumps hastily aside. The frequent and persistent low calling by the adults, as they cling, quite still, to the nest tree or a neighbouring one, seems designed to entice the young to fly out.

One morning at 0550 hours after a youngster had yaffled two or three shrill, loud notes intermittently over a period of forty minutes, the male came and fed it once; it stabbed at the adult's throat; these stabs were avoided and it was fed again. The male withdrew its head and the youngster shot out of the hole, flying about twenty yards into a neighbouring tree. Two of the brood were still in the hole at dusk.

It appeared to me that some if not all of the young remained clinging to the walls of the cavity when roosting after sanitation ceased, but this was impossible to ascertain with certainty.

Permission was granted to cut open the hole in the plum tree with the least possible damage and this was done nine days after fledging. A rectangular opening $2\frac{1}{2}'' \times 6''$ was made, the hole being deeper than was expected. A level surface of blackish, wet-looking material was visible. Quarter-inch holes were bored one below the other; from the first and succeeding ones came the wet stuff along the drill, and then a hole from which issued fine, dry, powdery wood dust. Thus the depth of the wet mass and the interior measurements of the hole were obtained: the distance from the lower edge of the entrance to the bottom of the hole measured some 40 cm., of which 5 cm. was taken up by the mass of wet material.

Most of the 5 cm. of wet material was spooned out. There was a slight stench from it; under a magnifying glass it appeared as tiny pieces of elytra coverings, such as could be expected from a diet of ants; there was one complete leg, but no other large pieces. In the mass were six larvae and two pupae of some Diptera species, evidently feeding there.

Only very occasionally before the final phase does the female leave without entering the hole after feeding; if she omits to do so on one visit she enters on the succeeding ones, and these omissions are almost always in the two days before she stops entering. The male is regular in entering the hole after feeding till the last day on which he does so, and then like the female his omission is a single occasion and he enters on his next visit to feed. Once either female or male is observed not to enter on successive visits, all entry by that bird is at an end: this is the general pattern of behaviour as observed with all the pairs, and fledging takes place normally two days after that on which the male ceases to enter the hole.

Occasionally the young may remain in the hole 6/7 days without entry by either bird. In 1953 there was a hole 12 ft. high in the bough of an apple tree growing on the crest of a slope, the hole facing directly south-west. There was no entry by either bird during observation on 4th July, nor during the periods when observations were made on each successive day till fledging occurred (observations between 4th and 9th July inclusive totalled 13 hours 12 minutes and covered about 21 visits by the parents to the tree). The young were expected to fly on the 6th. But that day a strong, blustering south-west wind played directly on the hole; when a head was put out to yaffle shrilly, it was withdrawn immediately. The gale continued till the 9th and at least two young were still in the hole late that evening. They were gone on the 10th. Once the adults cease to enter, a biological stage is complete and they seem incapable of resuming their former behaviour: they can only prolong the stage in which they are already acting if unusual circumstances occur.

The 5 cm. of material in the hole in the plum tree may have been deeper when the young flew, in the normal time, for decomposition had been proceeding for some days when the hole was opened. In the 1953 hole, where the young were confined more than twice the normal time the depth of excrement may have been as great as that found by Løppenthin.

Where did the young woodpeckers roost after fledging? In the twilight we searched a great many large apple trees, twenty feet high, and eventually disturbed seven birds; they were in two adjacent trees on the top branches where these levelled out before drooping. We had observed instances of the male bird squatting along the branch of an apple tree like a Nightjar (*Caprimulgus europaeus*), when men working in the orchard disturbed their feeding. This is probably the way the family roosts on trees during the summer period.

I am indebted to Mr. J. H. Owen for his letter, to the late Mr. C. J. Tillisch of Copenhagen for the translation of Løppenthin's note, and to Mr. I. J. Ferguson-Lees for his advice.

SUMMARY

During the first 12/14 days after young Green Woodpeckers hatch most of their faeces are swallowed by the adults inside the nest cavity.

During the next 4/5 days, the faeces may occasionally be swallowed in the hole; sometimes swallowed as the parent leaves the hole; and often carried out between the mandibles.

During the last 3/4 days there is no sanitation by the female and none by the male after the female has ceased for one to one and a half days.

There is an accumulation of excreta by the time the young leave the hole.

Green Woodpeckers probably roost on trees in the open in summer and squat along the branches.

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NOTES

Harlequin Duck in Shetland.—While watching waders at half tide at the Pool of Virkie, south Shetland, on the afternoon of 16th October 1955, we noticed a small dark duck which we believed was a female or first-winter Harlequin Duck (*Histrionicus histrionicus*) swimming and diving on the far side of the channel. Even at a considerable distance, when little detail was distinguishable, the whitish patches at the sides of the head were clearly seen. It flew on to a sandbank, momentarily stood erect, and M.R. approached to photograph it. It then attempted to rise into a strong north-west wind, but experienced considerable difficulty and was easily caught. It was taken to Spiggie for more detailed examination.

We were struck by the bird's apparently good condition. In the hand the small size was obvious. The wing measured 197 mm., bill from feathers 25 mm. and tarsus 30 mm. All these measurements are approximate as suitable instruments were not available. The general coloration of the head was mid-brown, with two whitish patches in front of the eye and a third behind it. The margins of these patches were less clearly defined than the bird's appearance in the field suggested. The mantle, back, rump and upper tail-coverts were an even dark brown; the scapulars were mid-brown, almost the same shade as the head; the wings were a uniform dark brown like the mantle, and there was no suggestion of a speculum. The upper part of the breast was light brown without the uniform appearance of the other areas, and was clearly demarcated from the white belly and under tail-coverts. The sides of the rump showed a greyish hue. The bill was noticeably short and was very dark brown in colour. The legs and feet were greyish-white and the webs dark brown. The eye appeared dark but the colour of the iris was not noted. The bird was examined in the hand by L.S.V. and U.M. Venables and Tom Henderson, who concurred with our identification.

The bird was photographed (see plate 4, lower) and immediately afterwards was released on the fresh-water Loch Spiggie, Again, the most obvious field-characters as it swam buoyantly into the wind were the small size and the three whitish patches on the head. It was noticed that the duck often cocked its tail after a rapid preen. It was seen again next day (the 17th) swimming vigorously and jerking its head, and still seemed to be in good condition. MAEVE RUSK and ISABEL M. N. RYAN

[Mr. Peter Scott informs us that Harlequin Ducks are not kept in captivity at all.—EDS.]

Twirling of Kestrels.—On 13th June 1955 David Wadge and I were walking along the River Meon in Titchfield Haven, Hampshire, when we saw a male Kestrel (*Falco tinnunculus*) fly across to the opposite side of the river and settle on a bough about half-way up a tall tree. Very soon thereafter a female Kestrel appeared from higher up the tree, and both birds flew across the river to our side and rose to a height of about 100 ft., where they gripped talons, spread their wings and held them motionless, and twirled down almost to grass level before letting go. All the time they were dropping, the female was on the underside, and they twisted round and round. Immediately afterwards both flew off hunting together.

According to the supplementary notes at the end of the fifth volume of *The Handbook*, D. K. Wolfe-Murray reported that a pair of Ravens (*Corvus corax*) "sometimes grip 'hands' and fall for 200 ft. or so before separating and righting themselves", and a pair of Buzzards (*Buteo buteo*) were "gripping claws and falling together like Raven". J. A. Nelder (*antea*, vol. xliii, p. 226) and G. W. H. Moule (*antea*, vol. xliv, p. 101) confirmed the habit for the Buzzard. Cold water was poured (*antea*, vol. xliv, p. 411) on the suggestion that it was a form of display, and Capt. H. A. Gilbert (*ibid.*), who suggested that it was a struggle between a nesting bird and an intruder, reported a similar performance by two Golden Eagles (*Aquila chrysaëtos*).

From my many observations on the Black Kite (*Milvus migrans*) in India, and from the present instance, I am convinced that this twirling is neither display nor aggression but play. I often saw the Kite do this trick and could see the talons locking bird with bird, and on each occasion it looked to me like a game, the pair spinning gently round as they slowly fell until, when about to collide with a roof or the ground, they let go and went about their business without any appearance of enmity. C. SUFFERN

Crane in Orkney.—A single Crane (*Grus grus*) stayed in the vicinity of Ingsay Farm, Birsay, Orkney, for some ten days in the spring of 1955, from about 17th to 27th May. I saw the bird on the 24th, when it was feeding on a field of oats at a range of a little over 100 yards from me. The general colour of most of the body and lower part of the neck was of a lightish grey, much the same shade as is the Heron (*Ardea cinerea*). The upper part of the neck was blackish with a white stripe running down each side from the eye. The head was also dark, as was the stout, medium length bill. No red patch on the head could be distinguished. The bird's most outstanding character was the long, drooping blue-black plumes hanging over the tail. Its movements were graceful and deliberate, and when walking each foot was daintily lifted, and poised before being set down. The body was almost horizontal, and the neck was gracefully curved. I did not put the bird up, but the farmer said that it would not stand too close an approach. He had seen it fly strongly with slow wing beats from field to meadow several times. E. BALFOUR
(*R.S.P.B. Warden*)

Crane in Suffolk.—On 25th May 1955, having been informed that a strange bird had been seen on Westleton Heath, Suffolk, I made my way there and was rewarded at once by seeing it fly past me at a height of about 150 ft. The bird alighted some 200 yards away and gradually made its way in my direction until it was within 150 yards. In all I watched it for some 2¼ hours, and had no hesitation in identifying it as a Crane (*Grus grus*). In flight it appeared to be larger than a Heron (*Ardea cinerea*); its head and neck were fully extended, and its legs projected beyond its tail. The general impression was of a black and grey bird. When it was on the ground I noticed the following points: bill, lightish and perhaps smaller than a Heron's; crown, dark; body, grey; wings, grey with black tips; tail, black and drooping; legs, darkish. There appeared to be a white stripe from behind the eye, and there was a black area from the chin to a point halfway down the front of the long neck. It was very alert all the time I was watching it, and in between intervals of feeding it used to stop and stand still, looking around it. Later in the day it flew on to the Royal Society for Protection of Birds Reserve at Minsmere, where it was also seen by Col. and Mrs. Boyle, Mrs. E. M. Bale and G. R. Edwards.

R. WOLFENDALE
(*R.S.P.B. Warden*)

[Mrs. E. M. Bale tells us that with Miss M. S. van Oostveen she also saw the Crane between 8 and 9 a.m. on 26th May at Walk Barn Farm near Westleton Heath, about one mile inland from Minsmere; the men working on the farm reported that they had noted it during the two previous days. Mr. F. K. Cobb informs us that what was presumably the same bird was seen at Walberswick, Suffolk, on 25th May by Messrs. R. B. Barstow and G. S. Ralston.—EDS.]

Aggressive display of young Curlew.—In May 1942 I had under observation the nest of a Curlew (*Numenius arquata*) with 4 eggs, near Glenapp, Ballantrae, Ayrshire. On 29th May one Curlew's egg was cracked. On 31st May all the eggs were chipping. On 1st June, 24 hours later, three young Curlews were hatched. Two lay flat in the nest as I bent to look at them, but one stood up and faced me aggressively, making itself as tall as possible, cheeping and flapping its tiny wings. Its age must have been a few hours only, and no parent birds were near it at the time.

M. D. CROSBY

[A previous note on this subject appeared in our June 1955 issue (*antea*, vol. xlviii, p. 280).—EDS.]

Song-flight of Wood Sandpiper on passage.—The two records on this subject published recently (*antea*, pp. 415-6) prompt me to mention that a Wood Sandpiper (*Tringa glareola*) was watched display-flighting at Gladhouse Reservoir, Midlothian, over a long period on the evening of 6th June 1955. Two other birds of the same species were present at the same time, and the way in which they kept together and tended to avoid the company of the singing bird rather suggested that they were paired. Possibly it was their presence that stimulated the unmated bird to display.

D. G. ANDREW

White-rumped Sandpiper in Midlothian.—On 21st August 1955 we found a White-rumped Sandpiper (*Calidris fuscicollis*) at Gladhouse Reservoir, Midlothian, feeding among Dunlin (*C. alpina*) and Ringed Plover (*Charadrius hiaticula*) on the large areas of mud that had been exposed as a result of the dry summer. R. W.

J. Smith and Charles Walker joined us in watching the bird and it was again seen the following day by A. G. S. Bryson and George Waterston and also on the 24th by G. W. and Miss E. V. Baxter. It had apparently left by the 25th. The date of its arrival is not so accurately known, but there was a big influx of Dunlin and Ringed Plover between the 16th and 20th and it seems likely that the Sandpiper came in with them. The following notes have been read and approved by all those who saw the bird.

Watched at ranges down to 30 yards (and once, briefly, at 15 yards), the greyer upper-parts enabled the White-rumped Sandpiper to be picked out easily among the accompanying Dunlin, almost all of which were birds of the year. The poor light made it impossible to obtain any accurate notes on the colour of the mantle, but the feathers appeared to be a mixture of ashy-grey and dark brown, in colour very much resembling the winter plumage of a Dunlin but presenting a coarsely scaled appearance quite different from the neater pattern of that species. A well-marked whitish stripe ran over the eye and enabled the bird to be picked out from its companions at considerable range even when only the heads were visible above a large stone. The upper breast was profusely streaked with grey and this extended on to the flanks. There was no appreciable difference in size between the Sandpiper and the smaller of the accompanying Dunlin, but in build it was more reminiscent of a Little Stint (*C. minuta*) with its short bill, neck and legs and rather rotund body. The bill was appreciably shorter, finer and straighter than those of the Dunlin, though it was still slightly longer than that of a stint, very slightly decurved and terminating in a square-cut tip. In flight the white upper tail-coverts stood out conspicuously above the blackish tail. The call-note, which was quite unlike anything we had ever heard before, was a shrill, high-pitched "tweek", sometimes repeated several times. It had little volume and did not carry very far. The leg colour appeared to be black but this feature could not be seen with certainty. Some observers noted the appearance of an upturned tail, an impression probably caused by the wing-tips extending beyond and obscuring the tail-feathers (see *antea*, vol. xlvi, p. 260). A.G.S.B. and G.W. noted that the Sandpiper differed from the Dunlin in its feeding methods. The latter were probing the mud fairly deeply whereas the Sandpiper pecked around on the surface of the mud.

Although these features leave no doubt that the bird was a White-rumped Sandpiper, it seems worth drawing attention to two points on which our observations differ from some previous published descriptions. *The Handbook* mentions "a pale shade on wing, but nothing comparable to white wing-stripe of Dunlin" and this is supported by the descriptions in some recent British records (*antea*, vol. xxxix, p. 186; vol. xlii, p. 331; vol. xlvi, p. 262). All those who saw the Gladhouse bird agreed that there was a distinct wing-bar which seemed to be very similar in extent to that of the

Dunlin. However, Peterson (*A Field Guide to the Birds*, 1947, p. 99) shows this species as having a more distinct wing-bar than the *Handbook* passage would lead one to expect. Evidently this feature is rather variable. Secondly, in the case of some recent records, mention has been made of the bird's slim appearance (e.g. *antea*, vol. xxxix, p. 186; vol. xlvi, pp. 260 and 261). Our impression of the Gladhouse bird was that it looked noticeably short-bodied and dumpy—an effect which was probably produced by the relatively short neck and legs.

JOHN HOY, A. J. SMITH and D. G. ANDREW

[As a result of this record D. I. M. Wallace has submitted to us a sketch of a bird seen by himself and other members of the Loretto School Ornithological Society at Musselburgh, Midlothian, on 9th October 1948. This bird was identified at the time as a Little Stint (*C. minuta*), but the sketch shows clearly the diagnostic features of the White-rumped Sandpiper—white rump, poorly defined wing-bar, short, slender bill, and conspicuous eye-stripe—and we consider that the bird was probably of that species. There are, however, no supporting field descriptions, and the rest of the evidence depends largely upon the memories of the people concerned. It seems to us, therefore, that this 1948 record cannot be regarded as certain.

The 1955 occurrence is the first fully authenticated one for Scotland.—EDS.]

White-winged Lark in Hertfordshire.—At 19.30 hours on 12th August 1955, following a period of north-easterly winds, a bird which was subsequently identified as an adult female White-winged Lark (*Melanocorypha leucoptera*), was seen by B.L.S. at the new Hilfield Park Reservoir, Hertfordshire. On the 13th and 14th it was watched by both of us and the following account is based on our joint field-notes. The bird remained in the area until the 17th during which period it was seen by various other observers including F. H. Jones and H. P. Medhurst. As the field-characters given in *The Handbook* (vol. I, p. 163) are rather scanty we give below full details of appearance and behaviour.

In flight it appeared at first sight much like a Skylark (*Alauda arvensis*) with a lot of white on the wings. It was generally flushed by itself, but on one occasion when it was put up in company with six Skylarks comparison showed it to be about the same size, though much heavier-looking; the wing length of the two species appeared about the same, but the tail of the rarer bird was shorter and square cut, though not as short as that of the Woodlark (*Lullula arborea*). The flight was identical with that of the Skylark, and on several occasions it glided down in a similar manner with the wings held rigid and slightly turned down at the tips, and the tail cocked just above the level of the back. On the wing the large white patch on the secondaries, the white outer web of the second primary (i.e. the leading edge of the wing) and the white outer rectrices were all very prominent. Viewed from below, or when banking over, the white under wing-coverts were also noticeable.

During five hours' observation B.L.S. was able to obtain two good views of the bird on the ground, on each occasion at a range of about 25 yards. The upper-parts were dark brown, much darker than those of a Skylark, though the pale edges to all the body-feathers gave a distinctly mottled appearance. On the closed wings, which were held slightly drooping, the white area on the secondaries and the white outer web of the second primary were both very prominent; the tips of the primaries were darker brown and there was a slight chestnut tinge on the lesser wing-coverts. Under-parts were greyish-white, throat pure white; breast streaked with dark brown fairly densely at the sides and more sparsely towards the centre; flanks streaked dark sandy brown. Cheeks and superciliary stripe whitish-yellow, lores and ear-coverts brownish with a dark streak running from the ear-coverts below the eye. Bill dark brownish-yellow, short and stout like a finch. Legs not seen clearly. No sign of a crest. The call note which was heard once or twice was very similar to, but distinguishable from, that of the Skylark.

This bird showed a preference for a fairly restricted area of bare soil with short, sparse vegetation, but it often went to ground in very thick grass where it would stay until almost trodden on. Generally speaking it was a very shy bird intolerant of observation on the ground, and showed a strong dislike of being away from cover. On the few occasions when it landed on bare soil it would stand very upright for a moment and then run very rapidly, like a wader, for the nearest tuft of grass where it would crouch down until flushed again. R. Meinertzhagen ("Review of the Alaudidae", *Proc. Zool. Soc. Lond.*, vol. 121, p. 86) mentions this habit of squatting in cover.

This is the first authentic record of this species in Hertfordshire and the 13th for the British Isles. Major W. Murray Marsden (*The Field*, vol. 174, p. 897) reported a supposed White-winged Lark at Great Gaddesden, Hertfordshire, on 20th April 1940, but the record was rejected. BRYAN L. SAGE and A. R. JENKINS

Greenish Warbler at Fair Isle.—A Greenish Warbler (*Phylloscopus trochiloides viridanus*) was caught in the Gully Trap at Fair Isle on the morning of 15th July 1955 and was present during the next nine days, being recaptured on the 17th and 23rd, after which it was seen no more. The upper-parts were a greyish olive-green, greyest on head, nape and rump, with the green most marked on the edges of the flight-feathers in the closed wing. The under-parts were whitish with some streaky yellow markings on the breast (not visible in the field), the under tail-coverts and bend of the wing pale yellow, and the axillaries and under wing-coverts yellowish-white. There was a greyish suffusion on the flanks. The tail-feathers were brownish-olive, except for the smoky-white outer pair, and the central pair showed dark "fault-barring" perhaps indicative of recent moult of these feathers. The wing-feathers showed more wear than the tail, abrasion being most marked in the right wing. The yellowish-white tips to the inner webs of the greater coverts and the long and almost straight superciliary stripe, extending nearly to the nape, were very prominent features in the hand and in the field. The bill, broad at the base, was dark brown on the upper and yellowish on the lower mandible; the tarsi were purplish-brown and the irides dark brown. The measurements were: chord of wing 58 mm., tail 43 mm., bill from skull 12 mm., tarsus 19 mm. Its weight when trapped at 0640 hours on 15th was 7.75 gm. and when recaptured at 0940 hours on 17th, 7.68 gm.—exactly 1 gm. heavier than the example trapped here on 2nd June 1949. On 23rd July it weighed 7.39 gm.

In the wing-formula the 3rd to 6th primaries showed emargination and the 1st primary was 7 mm. longer than the primary coverts; the 4th and 5th were equal and longest, and the 2nd primary fell just short of the 8th. On the basis of C. B. Ticehurst's study of this group (*A Systematic Review of the Genus Phylloscopus*, London 1935) there can be little doubt that the bird was an adult female of the western form *viridanus*. The wing-formula of 2nd primary = 8th/9th is unusual in *viridanus* and practically confined to females, which in the *Phylloscopi* generally exhibit a more rounded wing than males (*op. cit.*, pp. 20-21). The typical race has a longer bill and much longer 1st primary, and since there is a complete prenuptial moult in this species *plumbeitarsus* would almost certainly show some evidence of a second wing-bar on median coverts in July. The intergrade forms *ludlowi* and *obscuratus* are also precluded on bill-length and wing-formula.

In the field the head, nape and rump were the greyest part of the plumage, the folded primaries only showing green. The underparts showed no yellow. The creamy eye-stripe extended well to the rear of the eye in an almost straight line. The bird indulged in a continuous restless flicking of the tail and loosely-closed wings when seeking insects among the heather or the saplings in a small sycamore plantation,and a good deal of its time was spent in fly-catching. On one occasion it was seen to take a moth. Its flight was slow and fairly direct. When alarmed, it gave a musical disyllabic call-note "chee-wee".

This is the third occurrence at Fair Isle, birds having been recorded on 2nd-3rd June 1949 (*Scot. Nat.*, vol. 62, p. 20) and 19th September 1950 (*antea*, vol. xliv, p. 120); and it marks the eighth appearance of the species in the British Isles in the past ten years. KENNETH WILLIAMSON and VALERIE M. THOM

Greenish Warbler on the Isle of May.—On 27th August, 1955 a Greenish Warbler (*Phylloscopus trochiloides*) was trapped on the Isle of May by Miss F. E. Crackles and Lt. Col. H. G. Brownlow, and examined by the three of us. It was not seen before it was caught but was watched in the field on various dates thereafter by several observers up to 3rd September. It was retrapped on two of these dates and its weight was recorded as follows: 27th August, 6.8 gm.; 1st September, 7.6 gm.; 3rd September, 8.2 gm. This increase is probably the replacement of weight lost on passage presumably over the North Sea.

In the hand the bird was like a Chiffchaff (*Ph. collybita*) but it had a well defined wing-bar and its under wing-coverts were silky white instead of yellow. Its lower mandible was yellowish orange. The emargination of the 6th primary was only slight. This emargination was distinct on one wing but less distinct on the other. In the field the wing-bar was hard to see but the general colour relative to the Willow Warblers (*Ph. trochilus*) was greyer.

The wing-bar and the relative length of the 2nd primary (−8th and =7th/8th) indicate that the bird was of the race *Ph.t. viridanus*. This is the first recorded occurrence of the species on the island. A. G. S. BRYSON

[MR. Bryson has also sent us the full description taken when the bird was first trapped and this fully confirms the identification. —EDS.]

Richard's Pipit in Co. Donegal.—At about 4 p.m. on 19th August 1955, after some three days of strong southerly winds, I was looking for birds among the high sand-dunes above Tramore Strand, Horn Head, Co. Donegal, when I flushed near a trickle of water in dense herbage a large, lark-like, skulking pipit which after a brief, direct, almost dunnock-like flight dropped again into thick cover. As it flew away it looked very dark sooty brown, with little or no trace of rufous, olive or buffish tinge, and the even darker tail was rather broadly margined with clear white outer webs. After being twice flushed it alighted on a more open sandy place where I was able to write its description as it sat eyeing me tensely for at least a quarter of an hour.

The long, straight bill was deep and strong, and like the legs looked out of proportion to the bird's size and build. The upper mandible was tipped dark horn, paler at the base; the lower was yellowish-flesh, and when at intervals it put out its tongue the inside showed orange-flesh and the gape blood-red.

The head-pattern was distinctive. Under a plentifully flecked, dark brown crown, with possibly a suspicion of a creamy streak, ran a broad, creamy superciliary doubling round under the large, blackish eyes to form a faint and narrow eye-ring. A darker tract separated this from a crescentically curved creamy stripe below the eye, broadening into a moustachial streak to join the unspotted creamy chin and throat towards which converged a bold thrush-like pattern of large, heavy, blackish-brown striations or small patches, contrasting with the unspotted creamy belly. The very long, stout tarsus was flexed right back, and like the large toes was a distinctive coral or orange flesh-colour.

On first alighting here it momentarily wagged its long tail up and down like a wagtail; otherwise it was throughout tense, nervous and silent, although two or three times when it was out of view in cover I heard a weak, low, slightly finch-like chirp which may have come from it as I could find no other bird anywhere near. I flushed it without much trouble over a dozen times after flights of roughly twenty or thirty yards, and except on the one occasion it always slipped quickly into cover, even among herbage 1-2 ft. high. Once it alighted on dense marram grass and dived under towards the ground. The persistence of this unpipitlike behaviour and the strong preference for cover were the more marked as there was plenty of open sand and sward round about. The spot was about $\frac{1}{4}$ mile from the shore, and over 100 ft. above sea-level. Compared with Rock Pipits (*Anthus spinoletta*) watched a few minutes earlier and subsequently, it appeared fully as large or larger, definitely longer-legged and deeper-billed, less grey, more contrasty and far more silent and less active. It was a much larger and heavier bird than Meadow Pipits (*A. pratensis*) seen in numbers earlier the same day.

It was like no bird I had ever seen except a Richard's Pipit (*A. richardi*) put up from the flower-bed of a bungalow garden in Baluchistan on 2nd September 1952—"which I at first took to be a bunting" (quoting from field-notes made at the time) "but after being flushed again it alighted on the edge of the lawn and proved to be a very large pipit with longish bill and stout, long, flexed, pinkish legs and long toes . . . the breast was in the centre quite heavily striated dark brown and the outer tail-feathers were white; the back striated dark and paler brown; it walked pipit-like but was a coarser, more stolid bird". Reference to skins in the British Museum showed a good likeness to a female shot by Caton Haigh in Lincolnshire on 16th November 1912: there is appreciable individual variation but I am satisfied that there can be no doubt over the identification. E. M. NICHOLSON

Unusual Yellow Wagtail in Shetland.—An unusual Yellow Wagtail (*Motacilla flava*) was observed on marshy ground near Grutness pier, Shetland mainland, on 25th May 1955, by a party about to embark on M.V. "The Good Shepherd" for the journey to Fair Isle. The party included Harry A. Craw and Donald M. Walker, who discussed the bird with me on their arrival at the Bird Observatory, and it was also seen by William Crawford, an outgoing visitor who wrote a description in the "Log" kept at Tom Henderson's Hotel at Spiggie. The verbal accounts I received agree exactly with Mr. Crawford's note, which reads: "All of the party saw the bird two or three times for a minute or two as it moved about up to the pool. Apart from the fact that it was a *flava* wagtail—upper-parts olive and under-parts yellow—I noted that the forehead, crown and cheeks were uniformly dark, blackish. The nape was rather lighter and greyish in colour.

There was no eye-stripe, nor was any white noticed between the dark cheek and the yellow of the neck. The bird was seen at about 30 yards distance in good light". It was thought at the time that the bird might be a Black-headed Wagtail (*M. f. feldegg*), but *feldegg* has a completely jet-black head and nape, and it seems much more probable that this was an example of the rather scarce variety of the Grey-headed Wagtail (*M. f. thunbergi*) which has an extension of blackish feathering beyond the lores and ear-coverts to the sides of head and crown. Although a name has been given to such birds, *M. f. alakulensis*, by Grant and Mackworth-Praed (*Bull. Brit. Orn. Club*, vol. 69, p. 131 (1949)), on the basis of a single specimen from Lake Alakul in Turkestan, it appears to be merely an individual variant which crops up from time to time over the range of *thunbergi*. When examining the *flava* collection in the British Museum (Natural History) recently I had occasion to write in my notes on *thunbergi*: "black of ear-coverts sometimes extends to surrounding feathers, above eye and even on to crown"; and there is a specimen in the Dresser collection in the Manchester Museum which would meet Mr. Crawford's description, and which was taken at Christiania (Oslo) in Norway in May 1870. KENNETH WILLIAMSON

Scarlet Grosbeak in Yorkshire.—A bird caught at the Spurn Bird Observatory, Yorkshire, on 16th September 1955 was seen before being handled to have a very stout bill and conspicuous whitish wing-bars. After detailed examination, in which Miss A. E. Leach and M. M. B. Philpot took part, the bird was diagnosed as a female Scarlet Grosbeak (*Carpodacus erythrinus*). Subsequently the bird was shown to Messrs. R. S. Pollard, E. W. Ellis, E. Andressy, A. Frudd and Mrs. Frudd. Mr. Ralph Chislett confirms that this is the first record for Yorkshire.

The crown, mantle and scapulars were fawn streaked with brown, the rump was unstreaked, slightly lighter in shade and tinged with olive; ear-coverts and sides of neck were of a uniform dark fawn; throat and breast light buff, streaked brown; chin light buff, and belly pale cream, with under tail-coverts very slightly darker. The flanks were paler toned than the breast, with streaks less pronounced. The tail was forked, with rectrices and primary remiges dark brown, edged with greenish-buff. The conspicuous wing-bars were formed by whitish-buff tips to the greater and median coverts. The lesser wing-coverts were brown narrowly edged with cream. The upper mandible was leaden in colour, and the lower slightly lighter with a bluish tinge. From the nostril the bill measured 8 mm., and its depth at the nostril 9.5 mm. Legs and feet were grey-brown, and iris dark brown. The wing measurements taken supported the identification. While being trapped and also while being examined, the bird gave a soft, sweet-toned double call which might be rendered as "too-weet".

J. K. FENTON and H. G. BROWNLOW

REVIEWS

THE BIRDS OF THE BRITISH ISLES. By D. A. BANNERMAN and G. E. LODGE. (*Oliver and Boyd,* Edinburgh, 1955). VOL. IV. 259 pages; 29 plates. 45s.

THE present volume is a worthy successor to the preceding ones, but again whets the appetite for those which are to come. It covers the swifts, nightjars, bee-eaters, Hoopoe, Roller, woodpeckers, cuckoos and owls, and contains essays on 31 species, all but one of which are illustrated in colour by Mr. Lodge's fine plates. The text is on the same generous lines as before and includes a 12-page account, with illustration, of the Black Woodpecker. This species is retained in square brackets, but the prediction is made that the bird will soon gain a full place on the British List, arriving from Holland. The remarkable statement is made that Swans utilise the abandoned nest holes of the Black Woodpecker!

Dr. Bannerman continues his excellent policy of obtaining first-class help from observers who have worked outside this country on species little known here, among the most notable being Dr. Y. Hagen's observations on Eagle Owl, Snowy Owl, Tengmalm's Owl and Hawk Owl in Norway, details of which are not elsewhere available in English. The debt owed to Dr. H. M. S. Blair is very considerable, while some valuable notes on the Cuckoo and other species by Col. R. F. Meiklejohn have been included. Dr. Wetmore has written a large part of the accounts of American Nighthawk, Yellow-billed and Black-billed Cuckoos, but there is little information on N. American autumn distribution, migration habits or dates, or other points which could have a bearing on trans-Atlantic passage.

Under Blue-cheeked Bee-eater there appears the following statement:

> " The announcement by the Editor of *British Birds* (xlv, 1952, p. 227) that an example of *Merops superciliosus* had been identified in the Scilly Isles is apt to give the impression that the bird was an example of the typical race of the Blue-cheeked Bee-eater which is a native of Madagascar and whose range is *south* of the Equator. There is little doubt (if any) that the bird was an example of the Persian race. It would have been well if when the announcement occurred some qualifying note had been added to that effect."

Most readers of *The Birds of the British Isles* will doubtless accept this as a fair comment without referring to the original account which appeared in *British Birds.* In that account, however, which Dr. Bannerman must surely have read, the ranges of the various races of the Blue-cheeked Bee-eater were given, and it was stated " It seems probable that the bird which she saw belonged to the Middle Eastern race." It is difficult to understand why Dr. Bannerman chose to make his comment in such terms.

P.A.D.H.

FIFTY YEARS OF BIRDWATCHING. By A. M. C. NICHOLL. (*John Murray*, London, 1955). 127 pages; 23 plates. 12s. 6d.

MR. NICHOLL has brought together a number of pleasantly written but quite slight essays about birds, mainly in the west country. They are illustrated by his own photographs. He emphasizes the value of hides for intimate observation, but might have described in rather more detail what he saw from such close quarters. He has something interesting to say about the notes of Cuckoo and Chaffinch and among several good photographs is one of a Meadow Pipit helping to feed a Cuckoo in a Whitethroat's nest. He describes an exciting adventure on a cliff.

In one chapter he gives evidence of the great amount of destruction done by vermin to the eggs and broods of 200 nests that were kept under special observation, claiming that this far exceeds that done by human bird-nesters. This is, of course, true, but he must realize that these 200 nests, by reason of their having been searched for and discovered by man, were far more vulnerable than those that were untouched or not even approached. This must also apply to some work of the photographer, who, in order to photograph a bird satisfactorily at the nest, must at times move twigs or herbage and so expose it more readily to Magpie, crow or stoat that might otherwise have overlooked it. It was Lord Grey who suggested that birds might well say: "However benevolent your intention, do not look for our nests." And certainly the keen and increasing body of bird watchers must learn to do their nesting with care and discretion. A.W.B.

CORO-CORO—THE WORLD OF THE SCARLET IBIS. By PAUL A. ZAHL. (*Hammond, Hammond & Co.*, London, 1955). 214 pages; 41 illustrations. 18s.

THOSE who have read *Flamingo Hunt*, in which Dr. Zahl described his search for the breeding grounds of the fast-disappearing Roseate Flamingo, will welcome his new book. The author is a biologist who writes with considerable charm. His latest observations, on the teeming wild life of Venezuela, make excellent reading. Aided by the National Geographic Society, Dr. Zahl undertook an arduous one-man expedition, at the height of the rainy season, into the un-mapped llanos swamps among the upper tributaries of the Oronoco. Here, after many abortive journeys, first by dug-out canoe and eventually by light aeroplane, he finally located a breeding colony of 10,000 pairs of Scarlet Ibis (*Guara rubra*). Later, he succeeded in filming them at close quarters; the species had never previously been photographed at the nest. In the course of the expedition, he also photographed other interesting tropical species such as the Hoatzin, the Maguari Stork and the Boat-billed Night Heron. The author's description of the return journey, in the course of which he and his native guide became lost in the maze of water-ways, is very vividly written. This well illustrated book combines ornithological interest with a fine adventure story. The scientific observations are written with integrity and the story with becoming modesty. G.R.M.

NOTICE TO CONTRIBUTORS

Contributors are asked to observe the following points, attention to which saves the waste of much editorial time on trivial alterations:

1. Papers should be typewritten with double spacing, and on one side of the sheet only. Shorter contributions, if not typed, must be clearly written and with similar spacing. Failure to help in this way may result in delays to publication.
2. Notes should be worded as concisely as possible, and drawn up in the form in which they will be printed, with signature in block capitals and the writer's address clearly written on the same sheet. If more than one Note is submitted, each should be on a separate sheet, with signature and address repeated. In the case of rarity records, any supporting description which is too detailed for publication should be attached separately.
3. Certain conventions of style and lay-out are essential to preserve the uniformity of any publication. Authors of Papers in particular, especially of those containing Systematic Lists, Reference Lists, Tables, etc. should consult the ones in this issue as a guide to general presentation. English names of species should have capital initials for each word, except after a hyphen (e.g. Siberian Thrush, Yellow-headed Wagtail), but group terms should not (e.g. thrushes, wagtails). English names are those used in *The Handbook of British Birds,* with the exception of the changes listed in *British Birds* in 1953 (vol. xlvi, pp. 2-3). The scientific name of each species should be given (in brackets and underlined) immediately after the first mention of the English name. Subspecific names should not be used except where they are relevant to the discussion. It is sometimes more convenient to list scientific names in an appendix. Dates should take the form "1st January 1955" and no other, except in Tables where they may be abbreviated to "1st Jan.", "Jan. 1st", or even "Jan. 1", whichever most suits the lay-out of the Table concerned. It is particularly requested that authors should pay attention to Reference Lists, which otherwise cause much unnecessary work. These should take the following form:

TUCKER, B. W. (1949): " Species and subspecies: a review for general ornithologists." *Brit. Birds,* xlii: 129-134.
WITHERBY H. F. (1894): *Forest Birds: Their Haunts and Habits.* London. p. 34.

British Birds publishes material dealing with original observations on the birds of Britain and Western Europe, or where appropriate, on birds of this area as observed in other parts of their range. Except for records of rarities. Papers and Notes are normally accepted only on condition that the material is not being offered to any other journal. Photographs (glossy prints showing good contrast) and sketches are welcomed. Proofs of all contributions accepted are sent to authors before publication. After publication 20 separates of Papers are sent free to authors; additional copies, for which a charge is made, can be provided if ordered when the proofs are returned.

Various other conventions concerning references, including their use in the text, should be noted by consulting previous examples.

4 Tables should be numbered with Roman numerals, and the title typed above in the style used in this issue. The title and any headings within the Table should not be underlined, because this sometimes makes it difficult for the Editor to indicate the type to be used. It is most important that the layout of each Table should be carefully planned with an eye to its final appearance; above all, it should be borne in mind that Tables must either fit into the width of a page, or be designed to fit a whole page lengthways. All Tables should be self-explanatory.

5. Figures should be numbered with Arabic numerals, and the captions typed on a separate sheet. All line-drawings should be in Indian ink on good quality drawing paper (not of an absorbent nature) or, where necessary, on graph paper, but this must be light blue or very pale grey. It is best if maps, graphs, etc., are drawn twice the size of the final reproduction (ideally, therefore, for the normal 4″ width the original should be 8″ wide); sketches of birds, however, should be only slightly larger than the size at which it is intended they should appear. It is always most important to consider how each drawing will fit into the page. Unless the author has had considerable experience as a draughtsman, all lettering, figures, arrows, etc. should either be inserted lightly in pencil or else marked in position on a covering sheet of tracing paper. In maps it is often desirable to have a tinted (stippled etc.) area, and this should be indicated by a light-blue colour and left to the engravers.

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BRITISH BIRDS

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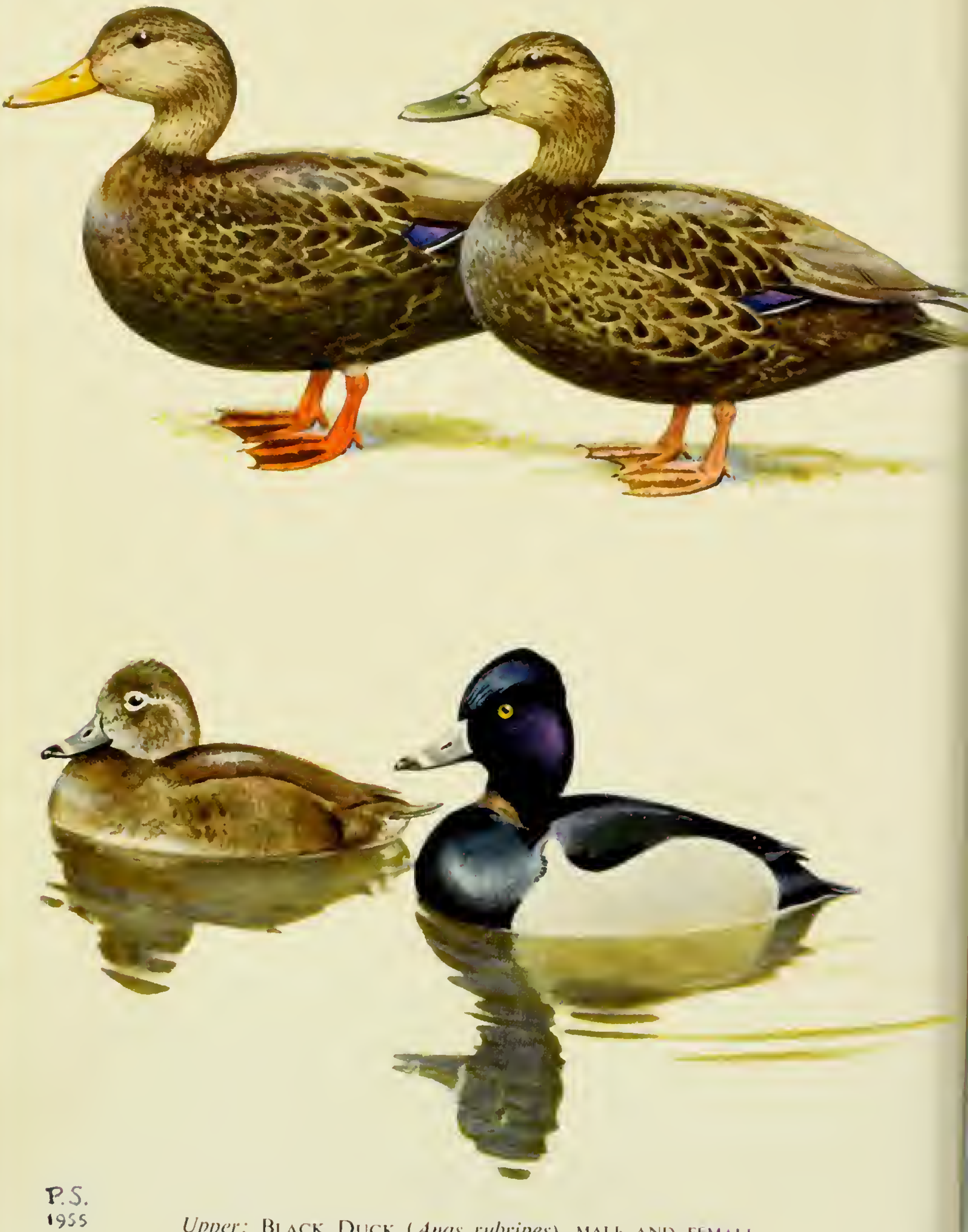
PLATE I



Upper: BLACK DUCK (*Anas rubripes*), MALE AND FEMALE
(♀, Co. Kilkenny, February 1954, see vol. xlviii, p. 341)

Lower: RING-NECKED DUCK (*Aythya collaris*), FEMALE AND MALE
(♂, Gloucestershire, 12th–14th March 1955, see vol. xlviii, p. 377)
(In each case the right hand bird is the one which occurred in Britain)

Specially painted for "British Birds" by Peter Scott

Vol. XLIX
No. 2

FEBRUARY
1956

BRITISH BIRDS

RECORDS OF WOOD SANDPIPERS IN BRITAIN IN THE AUTUMN OF 1952

By I. C. T. Nisbet

INTRODUCTION

During the autumn of 1952, as noted previously (*antea*, vol. xlv, p. 432), a considerable passage of Wood Sandpipers (*Tringa glareola*) was observed in many parts of Great Britain, particularly in the south-east. There is some evidence that the numbers of this species occurring on passage in Great Britain have been increasing, at least on an average, during the years 1950-54, but the numbers visiting the country in autumn 1952 seem to have been quite abnormal. For a variety of reasons the publication of this summary has been greatly delayed, but it is hoped that the conclusions drawn here will be of a general interest, apart from any value they may have in the study of migration.

The records from which this account has been compiled have been taken from several sources: some were sent in response to the appeal by the editors (*antea*, vol. xlv, p. 432), others have been sent directly to the author, and a number have been drawn from the reports of local ornithological societies, etc.; a full list of records and observers is given in the appendix to this paper.

Since the records used in a study of this kind are contributed voluntarily by a large number of ornithologists, many of whose observations are necessarily casual, a preliminary investigation was made of the records used here in order to assess the randomness of the sample, and consequently the extent to which a detailed analysis was justified. This investigation cannot be discussed in detail here, but it was found possible to construct a series of arrivals of which the dates are known to within quite definite limits (often 24 hours or less), which is then quite adequate for detailed analysis. In particular, no detectable bias was found towards observations at week-ends, at least until the end of August, when the main passage ceased. Most of the records of large arrivals refer to week-days, and even the casual records are more or less evenly spread amongst the days of the week. In view of this conclusion the casual records referring to week-end dates have not been discarded, though they have been treated with considerable caution.

Before the migration is analysed in detail an examination of the pattern of movement through the country leads to general conclusions without which the detailed records cannot be interpreted satisfactorily.

THE PATTERN OF MIGRATION THROUGH BRITAIN

Geographical.

The distribution of the records through the country follows the pattern which appears to be normal for the species, with much the largest numbers of birds noted south and east of a line from the Wash to the Solent; smaller numbers along the east coast north to the Shetlands; and occasional birds over most parts of England, and the west coast of England and Wales, especially in Cheshire, Anglesey and Cornwall. This distribution indicates clearly that the vast majority of the birds concerned reached Great Britain from the Continent by crossing the southern part of the North Sea or the English Channel, i.e. from north France, Belgium, Holland, and perhaps in some cases from Denmark. The possibility of approach from Norway is not ruled out, especially in the case of some of the northern birds, but the discussion below indicates that in all probability these birds also arrived from the more southern part of the North Sea.

In view of the restricted breeding-range of the species, it may be assumed that all the British records refer to Scandinavian breeding birds, which have presumably reached Britain by migrating along the North Sea coast. It may be noted that as the "normal" direction taken by Wood Sandpipers leaving Scandinavia is due south (Svärdson, 1953), the movement along the Dutch coast is essentially an outwash on the flank of the main passage of the species across Europe. It is therefore important to emphasize that this study is concerned only with the diversion of birds into Britain, and not with the main migration of the species.

In all, Wood Sandpipers were reported from just over 100 localities in Great Britain in 1952, though at most of these only a few individuals were noted. The concentration of birds at particularly favourable sites is quite remarkable: at only 14 localities were more than six birds recorded on any one occasion, but at 7 of these the numbers reached 15 or more, and there are four records of concentrations larger than 25. In view of the known habits of the species it seems unlikely that such large concentrations can be explained as due to the arrival of a single large flock; more probably the birds are prepared to fly some distance in search of a really favourable feeding-ground, even at the end of a long flight.

The records may be summarized briefly as showing a sudden immigration into parts of southern England in early July, followed by a period of scattered arrivals of small numbers before the main migration in large numbers in August. This may broadly be divided into several phases: a few large arrivals in East Anglia in early August, with scattered arrivals elsewhere, particularly in the north, from 1st to 13th August; a large immigration experienced in much of E. and S.E. England from 16th to 18th August, and another, rather smaller movement, affecting a larger area, especially in the west and south-west, from 19th to 26th August. After this numbers fell rapidly, and no significant immigration was noted during September.

Dynamic.

With the limitations of the method of investigation, discussed above, taken fully into consideration, the movements of the species may be analysed in terms of two more or less contradictory assumptions which appear to be implicit in most of the previous work of this type on bird migration through Great Britain. The first theory, in terms of which the "Migrations" sections of *The Handbook* were written, and which was in vogue until quite recent years, assumes that birds crossing the North Sea into Britain arrive on the north and east coasts, and work steadily south and west down the various coastal "routes" and inland; the theory that waders follow well-marked and fixed routes across the country along river-valleys, etc., is a natural extension of this idea. The second theory, developed mainly in recent years, assumes that, on account of changes in meteorological conditions, birds are stimulated to migrate more or less simultaneously over a wide area, and in consequence arrivals in Britain take place on a wide front and over a short period; in the case of waders it is often tacitly assumed that these "waves" reach the coast and pass straight inland, leading to arrivals over a wide area inland in a short space of time. For an example of this kind of hypothesis (applied to wader migration in spring) see Hinde (1951). This theory, with its emphasis on meteorological conditions as the primary factors controlling migration, has been closely associated with the development of the theory of migrational drift, discussed below.

The first theory finds remarkably little support in the 1952 records of Wood Sandpipers. It is true that most of the records for the north of the country are for the period 1st-10th August, and that the largest arrivals on the East Anglian coast were in the first week of August, while the largest numbers inland and in the south-west were in the period 16th-28th August; but the numbers in this latter movement were so much greater than those recorded earlier that it is clear that they resulted from a separate influx into the country. Examination of the records from the south-west shows a close agreement between the arrivals there and the main movements in eastern England; in the case of the Scilly Islands birds of 4th-5th July the correlation is exact, but the correspondence also extends to the main movements, between 17th and 26th August in the west and south-west, and between 16th and 28th August in the east.

One particular case is even more illuminating. In the movement of 4th-5th July (discussed below) some twenty birds were seen in the Thames Valley, and others in Cambridgeshire, Norfolk and Nottinghamshire; these dispersed slowly, some remaining until 15th July or later. The only arrivals reported in the country in the period 6th-14th July, however, were the following:—

Kent:—Grove Ferry, two on 6th July.
Norfolk:—Cley area, three on 7th July.
Devon:—Exe Estuary, one on 8th July.
Northamptonshire:—Ecton sewage farm, two on 9th July.
Cambridgeshire:—Cambridge sewage farm, three on 9th July; one on 13th July.
Cornwall:—Ryan's Field, two on 10th July.
Leicestershire:—Loughborough sewage farm, two on 12th July.
Middlesex:—Poyle gravel pits, two on 13th July.

These records hardly suggest a southerly or westerly movement through the country by the birds leaving the Thames Valley.

This evidence suggests that many, if not most, birds leaving localities in southern England left the country altogether without halting again, and that many, if not most, of the birds recorded in the west and south-west reached these areas by direct westward or north-westward flight from the Continent, and not by overland "routes" after leaving localities in the east or north. The records available are not sufficiently complete to disprove the "route" hypothesis completely, even for the one species in one autumn, but it is clear that the speculation which has already been made on the location of routes across the country would have been more profitable if some attempt had first been made to prove the existence of the supposed routes.

The evidence for the applicability of the "wave theory" to the migration of Wood Sandpipers is more equivocal. There is one good example of a wave in 1952— on 4th and 5th July, when birds arrived at points as widely separated as the Scilly Islands, Middlesex and Nottinghamshire. At other times arrivals extended over a considerable area in the course of a few days: e.g. between 16th and 19th August, when birds arrived in some numbers in the south-east (especially inland) and smaller numbers occurred west to Cornwall, Somerset, Warwickshire and Anglesey, and north to Yorkshire and even Fair Isle. But on individual days in this period (and on 4th and 5th July also) the geographical incidence of the arrivals was extremely erratic, with large numbers occurring at a few widely spaced localities on one day, and at different places in the same area on other days. It should also be stressed that there is evidence of arrival of Wood Sandpipers at some localities *on every day* during the main period of passage, and that at some times—for example the period 1st-8th August—the arrivals were so erratic as to provide clear evidence against the wave hypothesis.

Some other features of the movements also require extension of the wave concept. On 4th August (a bank holiday when records are full from many localities) some numbers of birds arrived at several marshes on the Suffolk coast. There are a few records elsewhere in the country suggesting arrival on that day, but the numbers are very small, and are probably not significant, so that the Suffolk records seem to represent a typical wave, but arriving on a front probably less than thirty miles wide. There is also evidence that at times such as the period 16th-19th August, when arrivals took place over several days, the immigration was discontinuous, with birds arriving once each day.

It seems clear that if even a proportion of the records of Wood Sandpipers in 1952 can be interpreted in terms of waves, it is necessary to postulate waves discontinuous in space and in time, and at times extending over very narrow fronts; in these circumstances the concept of a wave loses much of its meaning. The very random and erratic nature of the migration, however, at least at certain periods in the autumn, suggests that meteorological factors acting over a large area, such as temperature, wind, cloud, etc., did not have a primary effect in controlling the migration of the birds into the country. On the other hand, certain features of the migration pattern—the continuous series of arrivals; the restricted incidence of some of the influxes; the geographical distribution of the records throughout the country; the suggestion of discontinuous, once-daily arrivals—suggest that many of the records may be better interpreted as being due to a continuation or diversion of a migration, locally concentrated in space and time, along the Dutch and French coasts, with the direction and distance of flight after leaving the Continent varying from day to day and even from bird to bird.

On this hypothesis the immigration into Britain would be controlled more directly by the local state of migration on the Continent than by large-scale weather conditions, and it cannot therefore be expected that even a detailed analysis of the rather unprecise records available will give a precise estimate of the extent to which this generalization is true. Certain periods of the autumn do, however, give valuable information about the factors controlling the migration into Britain, and these are analysed in detail below.

DETAILED ANALYSIS OF MOVEMENTS

The theory of drift.

The concept of "migrational drift" has attracted a considerable amount of attention in recent years, particularly as applied to the occurrence of migrants outside or on the edge of their normal range, and it is therefore natural to consider its relevance to the present case. Westward crossings of the North Sea form the classic examples for the theory, and in this case it postulates that migrants which are disorientated (e.g. by fog or overcast weather) on or near the Continental coasts at night turn downwind and are passively drifted until they make a landfall. (See Williamson, 1952a and 1956, and references *ibid.*)

Apart from the influx of 4th-5th July, for which the evidence is somewhat equivocal, only one of the large influxes of Wood Sandpipers into southern England—that occurring between 16th and 20th August—carries any suggestion of having been caused by passive drift of this kind. However, the arrivals continued throughout this period, although drift was very improbable on the 17th, and the immigration progressed steadily after the 20th, when drift was quite impossible. In general the large influxes occurred with all types of wind conditions (though generally with unsettled, low pressure weather), and drift cannot be considered to have been an important factor governing the migration, although it may have affected *some* of the movements.

The small number of records for the north of Great Britain, however, form an exception to this, and most of those which give exact dates of arrival occurred under conditions quite typical of drift. The Scottish records of 8th-10th August are a good example of this—see Williamson (1952b).

It may be concluded that only a very small proportion of the birds on the Continental coasts in 1952 were subjected to drift: their conspicuousness in the north merely reflects the greater efficacy of the drift process in diverting birds well out of their normal range.

The "wave" of 4th-5th July.

The records of 4th-5th July have already been mentioned several times, and form perhaps the most interesting series of the whole autumn. The "wave" (which followed only two June records in the whole country) was foreshadowed by the arrival of a single bird in Norfolk on 3rd July, and reached its peak in the Thames Valley (Middlesex and Berkshire) on the 4th, with others arriving on the same day in Nottinghamshire, Cambridgeshire (4) and the Scilly Islands (5). Four more reached the Scillies on the 5th, when there may have been an increase in Middlesex, but the subsequent records (listed above) show no evidence of significant migration.

This movement must be regarded as quite exceptional, and in view of the abnormally early date it is natural to assume that the birds concerned had left their breeding-grounds only a short time previously. Dr. G. Danielsson has very kindly sent me a list of the diurnal migration of Wood Sandpipers observed on each day throughout the autumn at Ottenby Bird Station in S. Sweden, which provides some kind of index of the migration of the species out of Scandinavia (see Svärdson, 1953). The only record from Ottenby in 1952 which can be linked with the English observations is one of fourteen birds on 1st July; this figure is much larger than any other at the same period, but is if anything below the normal for a peak at this time of year. If this correlation is accepted the birds which reached the Scilly Islands on 4th July would have left Scandinavia about three days earlier, corresponding to an average speed of roughly 200-300 miles a day, and suggesting that they spent only a proportion of each day (perhaps four to twelve hours) actually in travelling.

The relation between this movement and the meteorological changes immediately preceding cannot be established exactly, but may be summarized as follows. The migration appears to have started on 29th/30th June (probably in north-central Scandinavia, as the birds did not reach Ottenby until 1st July) after a notable fall in night temperatures following the passage of a cold front—conditions similar to those described by Svärdson (1953) as typical of those leading to the so-called "avalanches" of southward migration at Ottenby. It seems then to have been further stimulated by good migrating conditions and a further temperature drop in S. Scandinavia on 1st/2nd July, to have turned west along the Dutch coast on 2nd and 3rd July, either as the wind turned westerly before the passage of a cold front, or in the overcast conditions following it, and to have continued westwards into Britain on the 4th and 5th in overcast conditions with generally strong N.E. winds. (The latter conditions are suggestive of drift, but the winds as recorded in the *Daily Weather Report* were consistently between N. and N.E. (bearings 350-050) and the "drift" can therefore hardly have been strictly downwind, unless it originated from well to the north of the Dutch coast; the places of arrival in Britain are also difficult to reconcile with the hypothesis of S.S.W. flight.) As the movement into Britain was exceptionally large, after a more or less normal exodus from Scandinavia, all these correlations carry some suggestion of causation, though this must be treated with reserve. In particular it must be stressed that these considerations apply only to the birds which reached Britain, and their relation to the other birds which left Scandinavia must be left open.

It may be noted that the interpretation of this movement as having taken place in a series of five or six daily flights, averaging several hundred miles each, is in good agreement with the deduction already made that the records as a whole indicate long flights into and out of southern England.

The influxes of 4th and 6th August.

It is difficult to establish any connection between the abnormally large immigrations into Britain in August and the state of migration on the Continent immediately before them. The records from Ottenby show well-marked peaks around 1st-2nd August (254 birds), 7th-9th August (879 birds) and 15th-19th August (159 birds) and it is tempting to relate these to the large movements in Britain in the periods 4th-6th, 16th-22nd and 23rd-26th August respectively. But although the total numbers passing Ottenby in 1952 were almost twice as large as those in either 1951 or 1953 (the

733 birds counted on 8th August 1952 almost equalling the totals for the whole of the autumns of the other two years) information very kindly sent by Mr. J. E. Sluiters indicates that they were not paralleled by any unusual numbers in Holland, so that in the absence of any detailed records for the latter country this correlation must be treated with considerable reserve. The discussion of the later movements must therefore be confined to a consideration of the sea-crossings into Britain.

Two large but localized arrivals which took place in early August are of special interest. The first was on 4th August, and affected the Suffolk coast between Breydon and Havergate only, about 40 birds being noted; the second was observed only at Cley, Norfolk, where 40 or 50 birds arrived on the 6th. Except perhaps for a few birds on 4th August the other records in Britain at this period show no connection with these influxes.

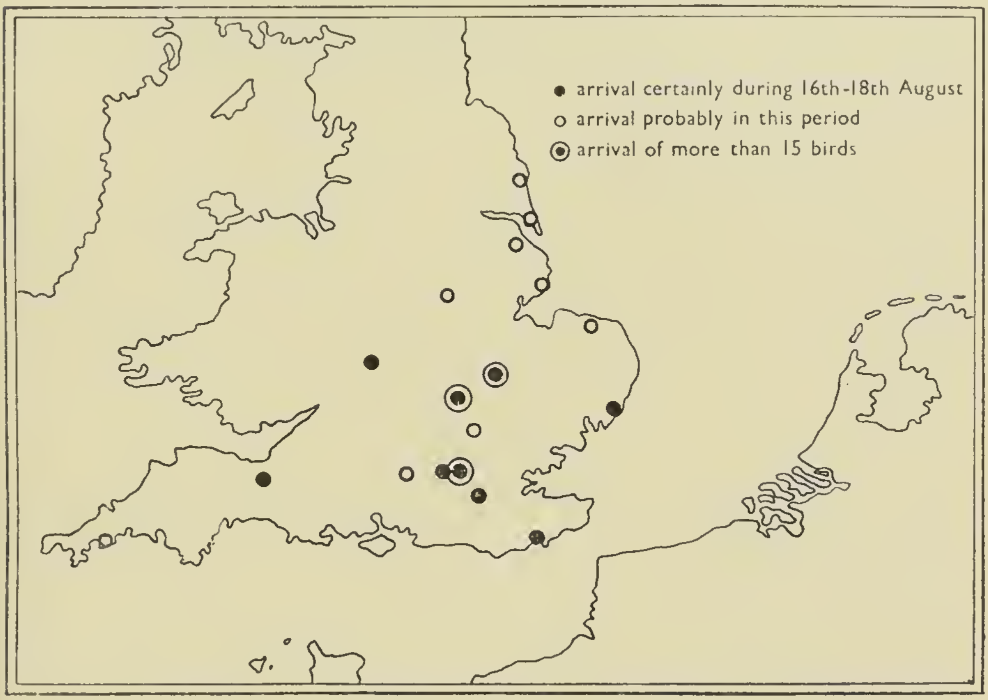
Both immigrations followed a long period of cyclonic westerly or south-westerly winds on the southern North Sea coasts, which lasted from 1st August (the day of the peak at Ottenby) until midnight on 5th August. The 6th was mainly cloudy, with light rain in places, and was generally calm or with very light winds, which tended to south on the Dutch coast and to east in eastern England, but were much too light to have affected the birds' course in any way. The arrival at Cley may be linked with this change and fall in wind. On the other hand, no significant change in conditions preceding the arrival on the 4th can be detected from the large-scale meteorological charts, and this forms the only major immigration in the whole autumn which occurred in westerly wind conditions. The Suffolk records of 2nd and 3rd August suggest that some migration was taking place in Holland at that time, and the large arrival on the 4th may therefore have been due to a sudden increase in this migration—possibly connected with the movement indicated by the rush at Ottenby 2-3 days earlier.

The arrivals between 16th and 28th August.

The largest immigration of the autumn started on 16th August, and lasted more or less continuously until 28th August, the numbers which arrived each day decreasing steadily after the initial large peak on the 16th and 17th. The analysis of this movement is rather difficult, as many of the records indicate arrival dates which are uncertain to within a day or two.

The records fall geographically into three main groups, consisting of the arrivals between 16th and 18th August, those between 19th and 22nd August, and those from 23rd August onwards. The first group is plotted on Map I; the records in the second period are grouped significantly farther south and west. The records for 23rd-24th August, a weekend, are mostly rather uncertain, and the subsequent records are of too small numbers to allow a detailed analysis, though the earlier ones at least seem to have been mainly in the south.

The meteorological situation at this period was complex, with changeable low pressure weather affecting the North Sea area after another period of W. to S.W. winds in Holland. The possibility that the arrivals in the first group were caused by drift from the Dutch coast has already been discussed briefly; it may be added that an attempt to make a detailed correlation does not support this view, although the winds at this time were predominantly N.E. Between 19th and 22nd August the grouping of the records in S. England suggests that the birds left the Continent south of Holland: the weather here was overcast at first, with variable or north-westerly winds, but was generally calm on the 21st and 22nd, with little cloud.


● arrival certainly during 16th-18th August
○ arrival probably in this period
⊙ arrival of more than 15 birds

Map I—Approximate positions of reported arrivals of Wood Sandpipers (*Tringa glareola*) in Britain between 16th and 18th August 1953

The conditions prevailing from 23rd to 28th August are extremely interesting. A high pressure system was stabilized over S. England and N. France, with low pressure developments to the N. and N.E. Throughout this period a westerly type of weather prevailed in Holland, with fairly strong W. to S.W. winds and variable, but mainly cloudy, weather; over N. France it remained calm and clear throughout. At this time the records are, though in smaller numbers, again grouped mainly in the south of England.

The restriction to the period 16th-18th August of the large migration (with N.E. winds) from Holland into eastern England, despite the continuance of similar weather until the 21st, suggests that the main mass of birds had passed through Holland by the 19th—probably the suggested immigration from further S.W. from the 19th to 22nd refers to the same movement on the Continent. From 23rd to 28th August, however, birds continued to arrive in Britain, and it therefore seems likely that a further movement was taking place through Holland at this time. If this deduction is correct, it provides a further example of the correlation, noted several times before, of migration through Holland with westerly wind conditions.

The inland occurrences.

An interesting feature of the autumn's records is that the incidence of the arrivals inland varied from time to time. The first influx on 4th-5th July, and the large immigration in the second half of August, were both observed much more heavily inland than on the south and east coasts, over which the birds may be presumed to have passed, but the arrivals on the East Anglian coast on 4th and 6th August were paralleled by scarcely any inland records.

A very tentative suggestion may be made that this may be connected with the time taken to cross from the Continent to the British coasts. None of the large inland arrivals occurred with strong westerly or north-westerly winds, but the coastal fall on 4th August followed a sea crossing made against a force four westerly wind, and the crossing to Norfolk on 6th August was probably longer than those taken by the birds occurring at other times. It seems possible that birds which have flown for a short time only usually cross a coastline and continue inland, while those which have flown for a long time usually halt on reaching the coast.

CONCLUSIONS

It is difficult to make generalizations about the migration of Wood Sandpipers in 1952. Broadly, the migration into Britain seems to be a continuation of a westward migration along the Dutch, Belgian and French coasts, this being essentially a diversion from the main southward movement of the birds leaving Scandinavia. The factors inducing the birds to make a sea-crossing into Britain, and determining the strength and location of the arrivals, seem to be mainly local in character, and it is not easy to associate them with large-scale meteorological conditions; nevertheless, certain tendencies do emerge from a study of the movements as a whole. In general, the movements are associated with unsettled, low pressure weather; there is a marked tendency for periods of migration through Holland to be associated with west and south-west winds, and with one exception the actual sea-crossings appear to have started at about the time and place that the winds ceased to blow from the west. These correlations, being based on one season's records only, are naturally tentative, but they may serve as a basis for future investigation. If this interpretation of the migration is correct, the cause of the large numbers in 1952 may have been the repeated occurrence of this type of weather in the southern North Sea area throughout the main period of passage of the species, but this question, and its relation to the suggested long-term increase in numbers, must remain open.

Perhaps the most important conclusion of this paper is its interpretation of the migration as having taken place in long flights into and out of Britain, with the birds flying long distances to find suitable resting-sites, and consequently the arrivals being distributed extremely haphazardly. In face of this conclusion the idea of fixed "routes" across the country and similar concepts based on the significance of the place of arrival lose most of their meaning. In addition it is clear that migration, at least of birds of this type, cannot be investigated adequately by observations at a few isolated points: only a widespread investigation of this kind can give an adequate picture of the migration as a whole.

ACKNOWLEDGEMENTS

Particular thanks must be offered to all the individual observers and editors of local reports who have contributed records, and whose names appear in the appendix to this paper. I am also greatly indebted to the editors of this magazine, and in particular to Mr. I. J. Ferguson-Lees, for every assistance in the collection of records, and to Mr. J. E. Sluiters and Dr. G. Danielsson who have supplied most valuable information from Holland and Sweden respectively. Dr. W. R. P. Bourne and Mr. D. Jenkins have also given valuable advice in the compilation of this paper.

SUMMARY

(1) In the autumn of 1952 an abnormally heavy passage of Wood Sandpipers (*Tringa glareola*) was noted in Great Britain.

(2) A detailed analysis is made of all records available, an assessment being given of the precision and value of this technique for studying bird migration.

(3) Various assumptions commonly made concerning the autumn migration of birds through Great Britain are shown to be inapplicable to the case under discussion. In particular, directly-acting meteorological conditions such as wind had only a secondary influence on the main movements.

(4) It is shown that the majority of the birds recorded during the autumn arrived by direct flight from the Dutch or French coasts, and that few birds halted at more than one locality before leaving the country altogether.

(5) Apart from a "freak" influx on 4th and 5th July, attributed to a particular combination of meteorological changes in N.W.

Europe, the majority of the birds recorded arrived in Britain between 1st and 28th August. This movement is broadly divisible into two phases: the first, between 1st and 6th August, was noted mainly in East Anglia; the second, starting on 16th August, affected most of southern England.

(6) The main movements are interpreted as a continuation of a westward passage along the Dutch and French coasts. The weather conditions under which this passage, and its continuation, occurred in 1952 are described and discussed briefly.

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APPENDIX

The following is a list of all Wood Sandpipers reported in 1952, from mid-June onwards, set out by counties. In some cases, where details are incomplete, or are published elsewhere, the records have been summarized. The abbreviations G.P. and S.F. are used for gravel pit and sewage farm respectively.

Scilly Isles.—Priglis Pool, St. Agnes, 5 arrived from S.W. on 4th July, 9 from 5th-7th July, last 2 towered and flew S. on 12th July; 2 on 19th Aug., increasing to 4 by 25th Aug., 2 present to 10th Sept. (Cornwall B.-W. and Pres. Soc. *per* A. G. Parsons).

Cornwall.—Ryan's Field, 2 on 10th July; present for the whole of Aug.; 4 on 30th Aug., 2 from 1st-5th Sept. Penrose, 1 on 10th Aug., 6 on 17th Aug. Croft Pascoe Pool, Lizard, 6 on 10th Aug. Walmsley Sanctuary, 3 on 23rd Aug. Hayle estuary, 1 on 9th Sept. Lelant estuary, 2 from 27th Aug.-5th Sept. Dozmary Pool, 4 on 24th Aug., 1 on 30th Aug. (Cornwall B.-W. and Pres. Soc. *per* A. G. Parsons; B. King).

Devon.—Exe Estuary, 1 from 8th-20th July. Teign Estuary, 1 on 2nd Oct. Lundy Bird Obs., 1 on 22nd Aug. (*Rep. Devon B.-W. and Pres. Soc., 1952*; P. Davis, R. F. Moore).

Somerset.—Durleigh Reservoir, 3 on 27th July, 4 on 17th Aug. and up to 3 until 21st Aug. Porlock Marsh, 1 from 10th-13th Aug. Minehead Marsh, 1 on 19th Aug., 4 on 1st Sept. Blagdon Reservoir, 1 on 31st Aug. (*Rep. Devon B.-W. and Pres. Soc., 1952; Proc. Bristol Nats. Soc., 1952; Rep. Som. Arch. and N.H.S.; 2nd Rep. Mid-Som. Nats. Soc.;* B. King).

Isle of Wight.—Yarmouth Marsh, 1 on 20th Aug. Medina estuary, 2 on 10th Sept. (Hants. Field Club per E. Cohen; M. C. Adams, J. Stafford).

Hampshire.—Farlington Marshes, 1 on 25th and 30th Aug., 4th, 5th, and 10th Sept. Dibden Bay, 1 on 19th and 21st Aug. (Hants. Field Club *per* E. Cohen; D. F. Billett, C. J. Henty, G. H. Rees).

Sussex.—Pett Level, 6 on 3rd Aug. R. Rother 6 on 7th Aug. Rye Harbour G.P., 2 on 26th July, 1 on 31st July and 4th Aug., 2 on 15th Aug. and up to 3 until first week in Sept., 1 on 27th Sept. Thorney, 2 on 8th, 14th and 16th Aug., 4-5 on 24th, 28th and 30th-31st Aug., 2-3 from 1st-7th Sept., 1 on 13th-14th and 21st Sept. Chichester G.P., 2 on 10th Aug. Lower Cuckmere Valley, 3 on 15th Aug. Midrips, 2 on 2nd Sept., 3 on 4th Sept. Records from Wicks include 3 on 16th Aug., 9 on 17th Aug., 11 on 21st Aug., 18 on 22nd Aug., 12 on 23rd Aug., 11 on 24th Aug. 9 on 29th Aug., 5 on 30th Aug. (*Sussex Bird Report per* G. des Forges; D. F. Billett, K. Brown, J. F. Burton, R. W. Crowe, I. J. Ferguson-Lees, C. J. Henty, B. W. Renyard).

KENT.—Stone Marshes, 1 on 23rd Aug. Grove Ferry, 2 on 6th July. Cliffe, 1 on 20th July. Elsewhere, "between 13th Aug. and 14th Sept., numbers generally were much higher than usual, and birds were reported from 9 (mainly coastal) localities on 17 dates. On 11 different dates 4 birds or more were seen, the maxima being 12 at Stoke on 24th Aug., 18 at the Wicks on 22nd Aug., and 5 at Backsand Point, Stour, on 13th Aug." See also under Sussex. (*Kent Bird Report,* and E. H. Gillham; London N.H.S. *per* G. E. Manser; *Sussex Bird Report per* G. des Forges; M. Barry, J. F. Burton, I. J. Ferguson-Lees, P. Gordon, W. G. Teagle).

SURREY.—Esher S.F., 1 on 10th Aug. Guildford S.F., 2 from 13th-21st Aug., 8 on 27th Aug. Bellfields, 2 from 13th-27th Aug. Beddington S.F., 1 on 16th Aug., 2 on 17th-18th Aug., 1 on 21st and 25th Aug. and 3rd Sept. (London N.H.S. *per* G. E. Manser; Guildford N.H. and Lit. Soc. *per* G. A. Hebditch; M. Barry, H. Bentham).

ESSEX.—Abberton Reservoir, one bird summered, present (3 seen together, 5 ringed) from 5th-21st Aug., 1 on 21st Sept. (*Rep. Essex B.-W. and Pres. Soc., 1952*).

HERTFORDSHIRE.—Old Parkbury, 1 on 4th Aug. and 20th Sept. Elstree, 1 on 29th Aug. (London N.H.S. *per* G. E. Manser).

MIDDLESEX.—Perry Oaks S.F., at least 4 on 4th July, 10 on 5th July, decreasing steadily to 1 on 15th July; 1 on 10th Aug., 1 from 12th-14th Aug., 2 on 16th Aug., 6 on 17th Aug., 17 on 18th Aug., decreasing to 8 on 28th Aug., 1 from 29th-31st Aug., 2 from 13th-27th Sept., 1 on 28th Sept. and 4th Oct., 2 on 5th Oct., 1 on 12th Oct. Southall, 1 on 16th July. Poyle G.P., 2 on 13th July. Ponders End S.F., 1 on 2nd and 20th Aug. King George VI Reservoir, 1 on 24th Aug. (Records collected by I. C. T. Nisbet and London N.H.S. *per* G. E. Manser; J. B. Lee Potter, J. Lord, M. F. M. Meiklejohn, C. A. White, J. D. Woodley).

BERKSHIRE.—Ham Fields S.F., 1 on 29th June, 8-9 on 4th-5th July, 5 on 10th July, 1 on 27th and 30th July, 2 or 3 on 8th, 11th and 13th Aug., 5 on 16th Aug., 1 on 17th Aug. and 4th Sept. Burghfield G.P., 1 on 4th and 24th July. Aldermaston G.P., 1 on 16th Aug. Abingdon S.F., 1 on 20th Aug., 2 on 24th Aug. (*Rep. Oxford Orn. Soc., 1952*; M. F. M. Meiklejohn, I. M. Walker).

OXFORDSHIRE.—Sandford S.F., 1 on 4 dates from 12th-21st Aug., 2 on 20th Aug. (*Rep. Oxford Orn. Soc., 1952*).

SUFFOLK.—Walberswick, 1 on 20th July, 3 on 2nd Aug., 2 on 3rd Aug., 7 on 4th Aug., 2 on 6th Aug., 1 on 15th Aug., up to 5 from 19th-21st Aug., 3 on 4th Sept., 1 from 5th-8th Sept. Minsmere, 1 on 28th July, 3rd-4th and 12th Aug., 3 on 14th Aug., 2 on 30th Aug. Reydon, 1 on 29th July, 4 on 3rd Aug., at least 26 on 4th Aug., 12 on 7th Aug., 5 on 9th-10th Aug., at least 14 on 14th Aug., 10 on 15th Aug., 5 on 19th Aug., 2 on 28th Aug., 4 on 1st Sept., 1 on 15th and 18th Sept. Havergate, 1 on 4th-5th Aug., 2 on 6th Aug., 1 on 15th Aug., 8 on 16th Aug., 5 on 17th Aug., 1 on 18th Aug., 2 on 19th Aug., 1 on 20th-22nd Aug., 1 on 26th-27th and 29th Aug., 3 on 30th Aug., 1 on 1st and 8th Sept. and 17th-20th Oct. Breydon, 1 on 4th Aug. Felixstowe Haven, 1 on 8th Sept. Redgrave Lake, 1 on 6th Aug. West Stow S.F., 1 on 23rd and 30th Aug. (*Suffolk Bird Report per* P.R. Westall, R.S.P.B. *per* J. H. R. Boswall; H. Bentham, R.S.R. Fitter, I.C.T. Nisbet).

NORFOLK.—Cley area, first arrival on July 3rd, increasing to 4 on July 7th and to 18 by 18th July; a gradual decrease thence to 4 on 2nd Aug.; a sudden increase to 40-50 on 6th Aug.; between 7th and 13th Aug. numbers estimated as at least 60; about three-quarters left on the night of 13th-14th Aug.; 20-25 on 15th and 18th Aug.; about 15 daily to 5th Sept., when another sudden decrease; subsequently only isolated records until 6th Oct., and the last bird noted on 14th Nov. Breydon, 1 on 4th Aug. Norwich S.F., 1 on 10th and 13th Aug. (W. F. Bishop, A. H. Daukes, R. S. R. Fitter, A. H. Hunt, M. J. Seago, C. A. White).

CAMBRIDGESHIRE.—Cambridge S.F., up to 5 from 4th-13th July, 1 on 18th and

20th July, 2 on 29th July, 1 from 4th-6th Aug., 10 on 7th Aug., 15 on 8th-9th Aug., 4-7 from 10th-18th Aug., up to 12 from 19th-25th Aug., 6-10 from 26th-28th Aug., 2 on 29th Aug., 1 from 31st Aug. to 6th Sept. and on 8th Sept. Peterborough S.F., at least 31 on 17th Aug., 4 on 19th Aug., 7 on 22nd Aug., 2 on 29th Aug. and 5th Sept. (Cambridge Bird Club *per* I. C. T. Nisbet; A. R. Jenkins).

BEDFORDSHIRE.—Willington G.P., 4 on 4th Aug. Dunstable S.F., 4 on 17th Aug. (*Bedfordshire Naturalist*).

NORTHAMPTONSHIRE.—Ecton S.F., 2 on 9th, 12th and 13th July, 1 on 3rd and 9th Aug., 3-6 on 10th Aug., 1 on 14th Aug., about 30 on 16th Aug., 5-9 from 17th-21st Aug., 14 on 23rd-24th Aug., 4 on 26th Aug., 6 on 27th Aug., 2 on 30th-31st Aug., 3 on 2nd Sept., 1 on 6th-7th Sept. (A. J. B. Thompson, M. F. M. Meiklejohn).

WILTSHIRE.—Lacock G.P., 1 on 22nd Aug. (*Rep. Wilts. Arch. and N.H.S.*, 1952).

WARWICKSHIRE.—Alvecote Pools, 1 from 17th-26th Aug. Rotton Park Reservoir, 1 on 3rd-4th Sept. (G. A. Arnold, M. J. M. Larkin).

ANGLESEY.—Malltraeth Pools, 1 on 19th Aug., 3 on 21st-22nd Aug., 4 on 26th-28th Aug., 2 on 30th Aug. (J. Baldridge, A. W. Boyd).

LINCOLNSHIRE.—Gibraltar Point Bird Obs., 2 on 14th Aug., 1 on 15th and 17th Aug., 3 on 27th-28th Aug., 1 on 14th Sept. Brigg Ponds, 1 on 1st and 28th Aug. Brocklesby Lakes, 1 on 17th Aug. Bishopthorpe, 1 on 15th Sept. (R. K. Cornwallis, S. A. Cox).

LEICESTERSHIRE and RUTLAND.—Eye Brook Reservoir, 2-3 on 12th Aug., 1 on 30th Aug. and 6th Sept. Leicester S.F., 1 on 9th Aug., 2 on 11th Aug., 1 on 16th and 19th Aug. Loughborough S.F., 1 on 12th July, 1 on 19th Aug., 2 on 23rd Aug., 1 on 24th Sept. Cropston Reservoir, 5 on 10th-11th Aug. (Leics. and Rutland Orn. Soc. *per* R. A. O. Hickling).

NOTTINGHAMSHIRE.—Dunkirk, 1 from 4th-6th July. Nottingham S.F., single birds to a total of three in second week Aug., 7 on 16th Aug., 1 on 24th Aug. (Trent Valley Bird-Watchers *per* J. Staton; *per* S. Allison).

CHESHIRE.—Altrincham S.F., 1 on 4th, 10th and 13th Aug. Frodsham Sludge Pools, 3 from 1st-9th Aug., 7 or more on 10th Aug., 4 on 13th Aug., 2 on 17th Aug., 5-6 on 21st, 24th and 26th Aug., 2-4 until 6th Sept., 1 on 14th Sept. (*Merseyside Nats. Assoc. Bird Rep.*, 1952-3; R. H. Allen, D. M. Behrend, T. H. Bell).

LANCASHIRE.—Freckleton S.F., 1 on 13th-14th and 26th-28th Aug. Astley Flash, 1 on 3rd-4th Sept. (T. Edmondson, N. Harwood).

YORKSHIRE.—Cherry Cob Sands, 2 on 10th Aug., 1 on 23rd Aug. Rise, 1 on 16th Aug. Kilnsea, 1 on 17th and 23rd Aug. Swillington Ing, 2 on 30th Aug., 1 on 31st Aug. and 7th Sept. Ringstone Reservoir, 1 on 11th-12th Aug. Gouthwaite Reservoir, 1 on 3rd and 4th Aug., 2-3 on 5th Aug. (*Yorks. Nats. Union Orn. Rep.*, 1952; I. G. Brown, H. O. Bunce, A. F. G. Walker).

DURHAM.—Primrose Ponds, Jarrow, 1 on 5th, 6th, 8th and 11th Aug., 3 on 12th and 14th Aug., 1 on 16th Aug. Boldon Flats, 1 on 28th July and 2nd Aug., 2 on 4th Aug., 3 on 10th and 12th Aug., 2 from 13th-15th Aug., 1 on 17th Aug. Teesmouth Marshes, 2 on 13th Aug., 1 on 14th, 17th and 24th Aug. (*Per* G. W. Temperley; F. G. Grey, E. Keys, L. McGowan).

NORTHUMBERLAND.—Monks House Bird Obs., 6 on 8th Aug., only 2 remained on 18th Aug., none by 21st Aug. Seahouses, 4 on 24th Aug. (*per* G. W. Temperley; J. Izzard).

EAST LOTHIAN.—Aberlady Bay, 3 on 10th Aug., 1 on 17th Aug. (*per* Dougal Andrew).

MIDLOTHIAN.—Gladhouse Reservoir, 1 from 10th-31st Aug. (Dougal Andrew).

WEST FIFE.—Shiresmill Pond, 2 on 12th Aug., 1 on 13th Aug. (*per* Dougal Andrew).

SHETLAND.—Fair Isle, 1 from 1st-8th Aug., 2 from 10th-12th Aug., 1 from 18th-20th Aug., 3 on 21st Aug., 1 on 22nd Aug. (*Bull. Fair Isle Bird Obs.*, No. 10, 1953).

THE MIGRATIONS OF BRITISH CHATS
(Oenanthe, Saxicola, Phoenicurus)
AS SHOWN BY THE RESULTS OF RINGING*

By Sir A. Landsborough Thomson, C.B., D.Sc.

The purpose of this paper is to analyse the recovery records of birds of species of "chats" ringed in the British Isles under the scheme now managed by the Bird-Ringing Committee of the British Trust for Ornithology and earlier by the late H. F. Witherby, Editor of *British Birds*. The group is for this purpose taken as comprising the genera *Oenanthe, Saxicola* and *Phoenicurus*. The number of records is small, but it seems convenient now to bring together the information that has hitherto been published only in a scattered way in periodical lists over many years. (There were no recoveries for any of these species under the former Aberdeen University scheme—A. Landsborough Thomson, *Ibis*, 1921, pp. 466-527.)

The number of birds ringed and recovered, of those species of "chats" that have yielded records under the scheme, are as follows:—

	Ringed to 31.12.53	*Recovered to 31.3.55*	*Percentage recovered*
Wheatear	6,110	(124)114	1.9
Stonechat	1,503	(15)14	0.9
Whinchat	2,918	17	0.6
Redstart	5,553	45	0.8
Black Redstart	246	(6)3	1.2

(The recovery figures shown in brackets are those counted before excluding certain records as non-viable, for reasons given later under the species concerned; the reduced totals are used in calculating the percentages. Where birds are trapped for ringing, the chances of retrapping affect the recovery rate in the usual way.)

The following is the age distribution of recoveries of birds ringed as nestlings, by years of life reckoned from April to March:—

	1st	*2nd*	*3rd*	*4th*	*5th*	*6th*
Wheatear	18	14(+1)	5			
Stonechat	9	1	—	1		
Whinchat	13	1				
Redstart	14	6(+1)	2	—	1	
Black Redstart	1	—	—	—	—	1

(The figure in brackets represents a bird recovered again in a later year. Although some other birds were definitely described by the ringers as birds of the year, the category is not sufficiently distinct to be analysed for age purposes, as some birds not so described may also have been immature, e.g. "migrant".)

The recovery records are summarized below species by species; conclusions are then drawn under general heads. In the summaries, the particulars of ringing are given on the left and particulars of recovery on the right.

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WHEATEAR (*Oenanthe oenanthe*)

Recovered in British Isles in year of ringing:

Of those ringed as nestlings, or as "young" in the breeding-season, 10 are excluded from the total of recoveries because they were found dead before they were able to fly; 9 others were recovered at the respective ringing localities later in the same summer.

Of those ringed otherwise than as nestlings, mostly as young birds trapped, 33 were recovered at the ringing localities later in the same year.

Recovered in British Isles in subsequent years:

Of those ringed as nestlings, 12 were recovered in the next year at or near the ringing localities—in one case 6 miles away. Early dates were 18th April at Skokholm (Pembrokeshire) and 27th April at Fair Isle. In three cases the birds were reported as nesting at distances of ¼, 1½ and 2 miles from the places of ringing. Four were males, four were females, and in four cases the sex was not reported on recovery. A further 3 ringed as nestlings were found nesting in their third summer at distances of 100 yards, ¼ mile and ½ mile from the places of ringing.

Of those described by the ringers as young birds, mostly trapped, 14 were recovered in the next year, 2 in the third year, 2 both in the second and third years, 1 female both in the third and fourth years and 1 male in the second, third and fourth years, at the places of ringing. One of these birds (♂), returning to Skokholm, was recovered on 25th March in its third year and on 26th March in its fourth.

Of those ringed as adults, caught on the nest or trapped, 5 were recovered in the next year, 3 in the third year, and 2 in both the second and third years, at the places of ringing. (Of the birds recovered in the third year, two were ringed as adult females on the nest and were nesting again at distances of ¼ and 1 mile.)

There are also the following records of return to places other than the ringing locality:—

001376	31.5.48 (pull.*)	Skokholm, Pembrokeshire, Wales	10.4.49 (♀)	Coventry, Warwickshire
K 2122	3.6.50 (pull.)	*Nr.* Sedbergh, Yorkshire	12.4.51 (♂)	Weybourne, Norfolk
XH 653	25.7.39 (ad. ♀)	Skokholm	1.4.40	*Nr.* Stokenham, S. Devon
M 2294	23.8.51 (juv.-1st winter)	Fair Isle	27.4.52 (nesting)	Nesting (*sic*), Shetland (60° 17′N. 1° 7′W.)

In the first three cases the distances apart are respectively 170 miles N.N.E., 180 S.E., and 118 S.E.; in none had spring migration necessarily been completed by the date of recovery, but the first bird may possibly have been off the line for an exact return. In the fourth case, the bird may have already moved from its native locality by the date of ringing: the distance from ringing locality to recovery locality is 55 miles N.N.E.

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* "Pull." is the term now internationally agreed for a nestling or chick not yet fully able to fly, and "juv." that for an immature bird beyond that stage.

Recovered abroad:

LX 147	6.6.52 (pull.)	The Cheviot, Northumberland	24.8.52	Capbreton, Landes, France
B 1083	28.6.48 (pull.)	*Nr.* Padiham, Lancashire	30.8.48	Cap Ferret, Gironde, France

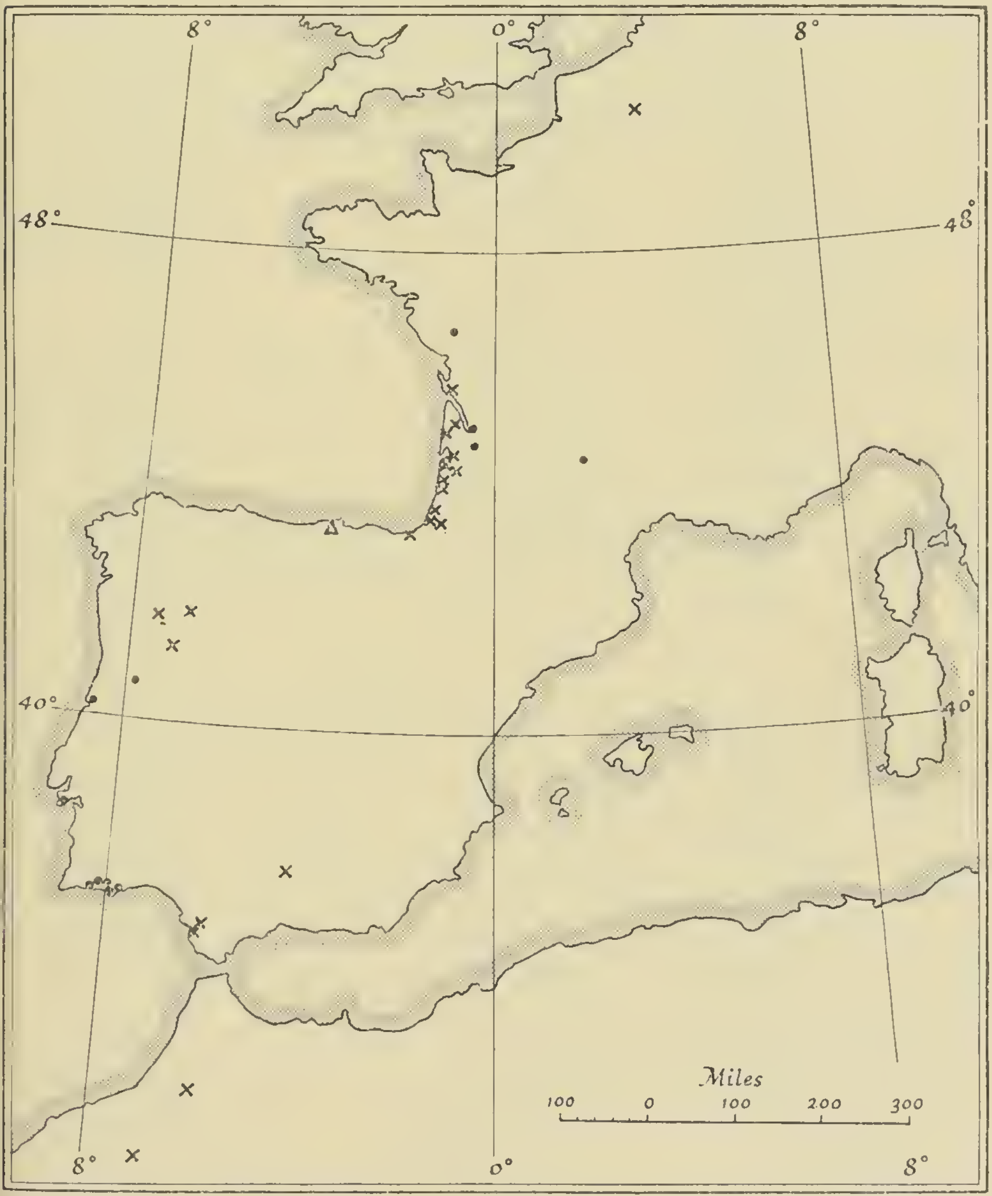

FIG. 1—RECOVERIES OF CHATS RINGED IN THE BRITISH ISLES
× Wheatear (*Oenanthe oenanthe*); ● Whinchat (*Saxicola rubetra*); ▵ Stonechat (*S. torquata*).

C 1821	27.6.24 (pull.)	*Nr.* Thornton, Bradford, Yorkshire	2.9.24	Saint Palais-sur-mer, Charente Inférieure, France
K 842	19.5.12 (pull.)	The Fylde, Lancashire	8.9.12	Cazaux, Gironde, France
ML 367	21.6.52 (pull.)	Fair Isle	15.9.52	Capbreton, Landes, France
CV 96	16.7.48 (pull.)	Fair Isle	20.9.48	Bragança, N. Portugal
LH 018	2.6.52 (pull.)	Skokholm, Pembrokeshire, Wales	26.9.52	Puerto de Santa Maria, Cadiz, Spain
MX 357	25.6.34 (pull.)	Northmavine, Shetland	29.10.34	Khouribga, Morocco (70 miles S.E. of Casablanca)
B 6839	8.6.26 (pull.)	Port of Menteith, Perthshire	—.1.27	Chavet, Traz-os-Montes, N. Portugal
10264	1.7.49 (pull.) 14.4.50 25.6.50 (breeding) 6.5.51 (do.) 28.6.51	Skokholm	21.8.51	Mimizan, Landes, France
J 8898	13.6.50 (pull.)	*Nr.* Ulpha, Cumberland	24.8.52	Contis-les-Bains, Landes, France
SL 518	18.6.46 (juv.)	Skomer, Pembrokeshire	18.8.46	San Sebastian, Guipuzcoa, Spain
10480	16.8.49—13.00 hours	Skokholm	18.8.49—08.00 hrs.	Capbreton, Landes, France
XH 281	7.8.38 (ad.)	Skokholm	6.9.38	Dar bel Hamri (Rharb), Morocco (40 miles E. of Rabat)
XH 315	30.8.38 (ad.)	Skokholm	11.9.38	Lacanau-Océan, Gironde, France
XH 291	18.8.38 (juv.)	Skokholm	12.9.38	Teste-de-Buch, *Nr.* Arcachon, Gironde, France
LH 951	7.8.53 (juv.)	Skokholm	13.9.53	Gaillan, *Nr.* Lesparre, Gironde, France
J 4309	28.8.50 (juv.—1st winter)	Skokholm	12.10.50	Jerez de la Frontera, Cadiz, Spain
M 2361	31.8.51 (juv.—1st winter)	Fair Isle	*ca.* 10.11.51	Maubeuge, Nord, France
K 9558	30.8.50 (migrant)	Isle of May, Firth of Forth, Scotland	9.5.51	Edsbyn, *Nr.* Söderhamn, E. Sweden (*ca.* 61°20′N. 15°40′E.)
CX 209	28.4.46 (ad.)	Skokholm	23.5.48	R. Oelfusá, S.W. Iceland

F 0011	21.7.49 (juv.)	Fair Isle	1.9.51	Cañete de las Torres, Cordoba, Spain
M 2103	18.7.51 (juv.)	Fair Isle	9.10.52	Azibo, *Nr.* Macedo de Calveiros, N. Portugal

Ringed abroad, recovered in British Isles :

Copenhagen 872 203	6.7.48 (pull.)	*Nr.* Jakobshaven, K'ek'ertak, W. Greenland (*ca.* 69°58'N. 51°15'W—*nec* 62°58'N.)	25.5.49	Letchworth, Hertfordshire

(*Brit. Birds*, 1950, vol. xliii, p. 285; *Dan. Orn. For. Tidds.*, vol. 44, p. 169.)

The recoveries abroad may be summarized as follows:—

Recovery area	*Number of records*	*Range of dates*
N.E. France	1	10.xi
S.W. France	11	18.viii—15.ix
N. Spain	1	18.viii
N. Portugal	3	20.ix, 9.x, -.i
S. Spain	3	1.ix, 12.x
Morocco	2	6.ix, 29.x
Sweden	1	9.v
Iceland	1	23.v

The earliest dates for recoveries, in the first year, of birds ringed as nestlings are:—France 24.viii, N. Portugal 20.ix, S. Spain 26.ix, Morocco 29.x. The bird recovered in Morocco on 6.ix had been marked as an adult (on migration?) at Skokholm just a month previously.

STONECHAT (*Saxicola torquata*)

Recovered in the British Isles:

Of those ringed as nestlings, 6 were recovered at the respective ringing localities later in the same summer (not counting one that had never left the nest): 3 during their first winter 8 miles N., 30 miles N., and 45 miles W. of the ringing localities; 1 in its second winter 23 miles N.; and 1 in its fourth winter 74 miles W.S.W. (Largo, Fife, to Georgetown, near Johnstone, Renfrewshire). As it happens, all the winter recoveries relate to birds ringed in the southern half of Scotland.

Of birds trapped, 2 ringed in October were recovered at the ringing localities in the following January and April respectively.

Recovered abroad:

B 43114	30.9.53 (trapped)	Portland Bill, Dorset	20.11.53	Santander, Spain

This bird was presumably a migrant at the date of ringing, and there is nothing to indicate what its native locality, or indeed country, may have been.

Whinchat (*Saxicola rubetra*)

Recovered in British Isles in same year:

Of those ringed as nestlings, 4 were recovered at the respective ringing localities later in the same year.

Recovered in British Isles in subsequent years:

Of birds ringed as nestlings, 1 was found in the following summer as a female sitting on eggs within 200 yards of the place of ringing (near Blackpool, Lancashire).

Recovered abroad:

Ten ringed as nestlings were recovered in their first autumn as follows:—

LK 769	10.6.52 (pull.)	*Nr.* Killin, Perthshire, Scotland	4.9.52	Chantonnay, Vendée, France
K 967	25.6.12 (pull.)	Kinnelhead, Dumfriesshire, Scotland	15.9.12	*Nr.* Galgon, Gironde, France
LR 868	21.6.35 (pull.)	*Nr.* Kirby Lonsdale, Westmorland	19.9.35	Aubie et Espessas, Gironde, France
L 6742	—.6.31 (pull.)	Ingleton, W. Yorkshire	21.9.31	Paderne, Algarve, Portugal
H 7408	—.6.29 (pull.)	Ingleton, W. Yorkshire	late 9.29	Sesimbra, Portugal
LB 699	15.6.35 (pull.)	*Nr.* Penrith, Cumberland	—.9.35	Cénac, Gironde, France
ED 7	13.6.38 (pull.)	Laugharne, Carmarthenshire, Wales	—.9.38	Faro, Algarve, Portugal
LN 969	20.6.53 (pull.)	*Nr.* Ashopton, Derbyshire	—.9.53	Alfandanga, *Nr.* Olhao, Algarve, Portugal
MW 20	20.7.25 (pull.)	Dalston, Cumberland	7.10.25	Cunha Baixa, Mangualde, Beira, Portugal
Y 239	15.6.14 (pull.)	Ingleton, W. Yorkshire	4.10.14	*Nr.* Loulé Algarve, Portugal

Of birds trapped for ringing, the only 2 recovered were both abroad, as follows:—

L 0402	8.5.51	Isle of May, Firth of Forth, Scotland	20.9.51	*Nr.* Coimbra, Portugal
B 29852	27.8.53	Seahouses, Northumberland	*ca.* 20.11.54	*Nr.* Loulé, Algarve, Portugal

The recoveries abroad may be summarized as follows:—

Recovery area	*Number of records*	*Range of dates*
W. France	1	4.ix
S.W. France	3	15.ix, 19.ix, -.ix
Portugal	8	-.ix, 20.ix—*ca.* 20.xi

All the birds were ringed as nestlings in the year of recovery, except two (trapped) of those recovered in Portugal—including the one with the late date.

REDSTART (*Phoenicurus phoenicurus*)

Recovered in British Isles in same year:

Of those ringed as nestlings, 6 were recovered later in the same summer at or near the ringing localities. Of those ringed as migrants in autumn or spring (at the Isle of May and Spurn Head Bird Observatories, with two exceptions), 16 were retrapped after the following intervals:—next (2nd) day, 7; 3rd day, 5 (2 of them also on 2nd); 4th day, 2 (1 also on 2nd); 5th day, 1; 6th day, 1. So far as can be seen by an examination of the records themselves, with the aid of a perpetual calendar, there does not appear to be any notable excess of trapping on particular days of the week such as might introduce a bias in favour of short periods; the intervals thus give some indication of the length of stay.

There is also the following case:—

B 26967	25.4.54 (ad. ♂)	Sandwich, Kent	10.6.54	*Nr.* Loch Ailort, Inverness-shire, Scotland

Recovered in British Isles in subsequent years:

Of birds ringed as nestlings, 5 were recovered in the next year, 1 in the third year, 1 both in the next and the third year, and 1 (♀) in the fifth year, all at or near the ringing localities.

Of birds ringed as breeding females, 1 was recovered in the next year, 1 in the third year, and 1 both in the next and the third year, at or near the places of ringing.

Recovered abroad:

NC 491	8.6.52 (pull.)	Kielder Forest, Northumberland	*ca.* 16.9.52	*Nr.* Viseu, Portugal
K 4206	9.6.50 (pull.)	Forest of Dean, Gloucestershire	25.9.50	Bragança, N. Portugal
EM 179	14.6.38 (pull.)	Ullswater, Westmorland	26.9.38	Amiera, Portalegre, Alentejo, Portugal
KK 956	9.6.53 (pull.)	Forest of Dean	30.9.53	Pradilla de Ebro, Zaragoza, Spain (41°52′N. 1°16′W.)
AK 81	16.6.15 (pull.)	Leck, Westmorland	1.10.15	*Nr.* Niza, Alentejo, Portugal
B 22452	6.6.53 (pull.)	*Nr.* Kendal, Westmorland	1.10.53	Vitoria, Alava, Spain
NW 34	9.7.20 (pull.)	*Nr.* Cheadle, Staffordshire	2.11.20	Ossés, Basses-Pyrénées, France
B 11632	12.6.53 (pull.)	Everingham, Yorkshire	16.9.54	Alcobendas, Madrid, Spain (40°34′N. 3°38′W.)
JD 221	12.9.52 (juv. ♀)	Gibraltar Point, Lincolnshire	5.10.52	Mazan, Vaucluse, France

JD 366	1.10.52 (♀)	Gibraltar Point	9.10.53	Nr. Cabra, Cordoba, Spain
HP 352	29.4.38 (♀)	Skokholm, Pembrokeshire	—.10.39	Niza, Alentejo, Portugal

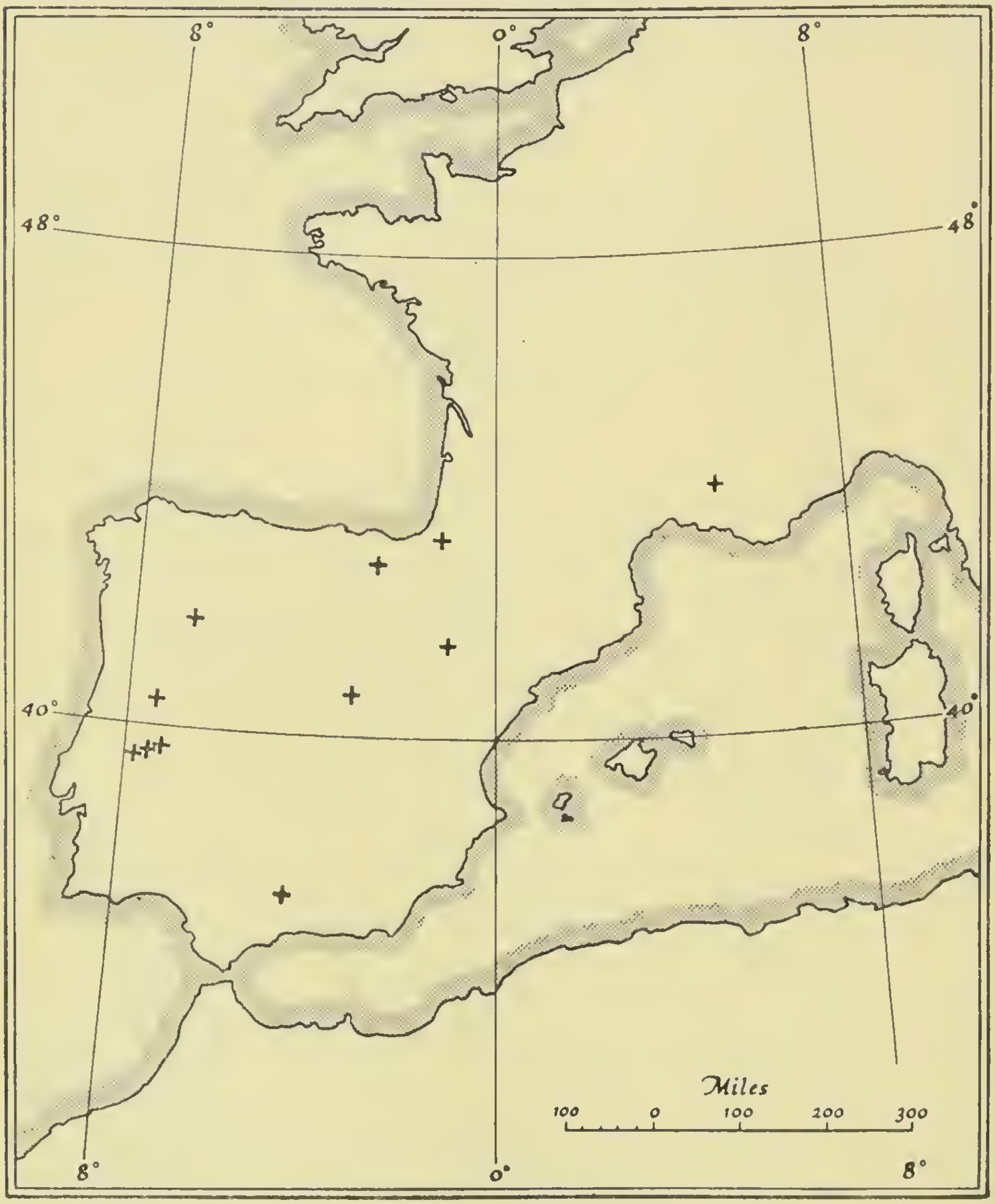

FIG. 2—RECOVERIES OF REDSTARTS RINGED IN THE BRITISH ISLES
+ Redstart (*Phoenicurus phoenicurus*).

Ringed abroad, recovered in British Isles:

Helgoland 9 372 823	18.5.50 (♀)	Wangerooge, E. Frisian Is., Germany	11.5.51	Holy Isle, Northumberland

(*Brit. Birds*, 1952, vol. xlv, p. 459).

Radolfzell K 26 637 (*fide* E. P. Leach)	2.9.53 (♀)	Ottenby, Öland, Sweden	15.9.53	Sandwich, Kent

The recoveries abroad may be summarized as follows:—

Recovery area	*Number of records*	*Range of dates*
S.W. France	1	2.xi
S.E. France	1	5.x
N. Spain	3	16.ix to 1.x
Portugal	5	*ca.* 16.ix to -.x
S. Spain	1	9.x

The earliest dates for the recovery, in the first year, of birds ringed as nestlings are:—France 2.xi, Spain 30.ix, Portugal *ca.* 16.ix. The easterly location of two of the recoveries in N. Spain is notable.

BLACK REDSTART (*Phoenicurus ochruros*)

Recovered in British Isles in same year:

Three records are excluded—2 nestlings found dead at nest and one migrant caught at sea and found dead at place of release on land within two days. There is 1 record of a nestling recovered later in the summer at the same place.

Recovered in British Isles in a subsequent year:

B 4570	3.7.47 (pull.)	Pett Level, Sussex	21.6.52 (breeding ♂)	Dover, Kent

The distance is 31 miles N.E.; the bird was in its sixth year when recovered.

Recovered abroad:

LV 208	12.4.53 (migrant ♀)	Isle of May, Firth of Forth	*ca.* 27.6.53	Elbingerode, Harz, Germany (51°47′N. 10°47′E.)

Ringed abroad, recovered in British Isles:

Helgoland 8 705 248	15.7.51 (pull.)	Halle a/d Saale, Saxon Anhalt, Germany (51°28′N. 11°58′E.)	27.10.51	Spurn Head, Yorkshire

(*Brit. Birds*, 1952, vol. xlv, p. 459.)

GENERAL CONCLUSIONS

Recovery statistics.

The proportion of ringed birds recovered (excluding non-viable cases) ranges from 0.6 per cent. for the Whinchat to 1.9 per cent. for the Wheatear. The figures are fortuitously affected by retrapping at some ringing localities, and no useful deduction can be drawn. Tabulation of recoveries by years of life (for birds ringed as nestlings) shows the usual picture of predominant mortality in the first year.

Local movements.

It seems remarkable that there are no recoveries at all during the autumn from the British Isles, such as would indicate the pre-emigratory movements of the summer visitant species. In the case of the resident Stonechat there are a few winter records showing local movement up to 74 miles W.S.W. (and up to 30 miles N.).

Return in subsequent years.

For two of the summer visitant species, Wheatear and Redstart, there are numerous records showing exact return to the native or former breeding localities, both in the year following ringing and in later years. In the case of the Wheatear this applies, in a small proportion of instances, to both sexes; in the Redstart, so far as the records show, only to the female. For the Whinchat there is a single record—a female breeding at its native locality.

In the case of the Black Redstart (not necessarily emigratory) there is a record of a male breeding in its sixth year 31 miles from its native locality. There is not sufficient evidence to show the degree of constancy to native locality in the case of the Stonechat.

For none of the species is there any evidence of even occasional return to other than the original area, although one or two spring records for the Wheatear may be equivocal as regards the degree of accuracy of return.

Southward migration.

In the case of the Wheatear, one record from N.E. France in November is exceptional both as regards place and date. Otherwise the records for southward migration are all from S.W. France (11), W. Spain and Portugal (7), and Morocco (2). All of these, except one from Portugal in January, fall in the period from mid-August to October.

The records for the Whinchat are from W. France (1), S.W. France (3), and Portugal (8), in the period from September to November. The only record showing emigration on the part of the largely resident Stonechat is from N. Spain in November.

The records for the Redstart are from S.W. France (1), S.E. France (1), and Spain and Portugal (9). Two of the records from N. Spain are from localities notably far towards the east side. All the records fall in the period from mid-September to very early November.

There is thus an indication of a more easterly trend on the part of the Redstart, as compared with the Wheatear and Whinchat: the distribution of the records may be described as continental rather than coastal. There is only one record for the Redstart from S.W. France, the area which yields most records for the Wheatear; two of the Spanish records are far distant from the Atlantic seaboard; and the record from S.E. France suggests a possible further progress through Italy. More records for this species are required.

All but one of the records are for the autumn and none for the spring; the predominance of autumn records has been noted in various other species, and the fact that the return movement in spring is unrecorded must be attributed to factors which lessen the chances of recoveries. The total absence of records from tropical Africa (Wheatear, Whinchat, Redstart) is explicable in the same way and is correlated with the almost complete absence of winter records; similarly, only the Wheatear has yielded recoveries from N. Africa, through which the Whinchat and Redstart must also pass.

Other movements.

Summer records of the Wheatear from Sweden, Iceland and Greenland, and of the Redstart from N.W. Germany and Sweden, indicate the breeding area of birds coming through the British Isles on passage. The Wheatear from Greenland can be ascribed to the race *Oe. oe. leucorrhoa.*

The two overseas records for the Black Redstart are of special interest. The bird native to N. Germany and recovered on the Yorkshire coast in its first autumn shows a movement in a W.N.W. direction. The female on spring migration in the Firth of Forth and recovered in N. Germany before the end of June in the same year shows a movement to the S.E. It is a matter of speculation whether it was a German native bird off its course on the first occasion but eventually finding its proper area, or a bird originally on its proper course and subsequently displaced to an abnormal summer area. In either event there are the facts that the capture for ringing coincided with a period of S. or S.W. winds and was shortly followed by wintry weather and winds in the direction from Scotland to N. Germany. (Note on meteorological position by Professor H. Seilkopf of Hamburg, communicated by the Vogelwarte Radolfzell).

Miscellaneous.

Not often does a recovery record give an indication of the distance covered by a migrant within one or two days. Of interest, therefore, is the case of a Wheatear recovered in France, at a distance of about 585 English miles, 43 hours after it was ringed in Wales.

Retrapping of Redstarts ringed on migration, mainly at bird observatories on the east coast of Great Britain, has shown that some are still present after one or two days, and a smaller number after from three to five days.

DELAYED EMIGRATION OF CERTAIN BIRDS IN AUTUMN 1954

By J. A. G. Barnes

PART I—SUMMER-VISITORS

Several notes received by the Editors of *British Birds* in the winter of 1954-55 confirmed the impression of some individual observers that the departure of migratory birds, both summer-visitors and passage-migrants, had been unusually delayed in the autumn of 1954. Appeals for information on this subject in *British Birds, The Field* and *Country Life* brought only a moderate response, but a number of County Recorders kindly sent details of late occurrences in advance of publication and further data have been obtained from County and other local reports. The writer is greatly indebted to Mr. I. J. Ferguson-Lees for his help and advice in the preparation of this paper.

A study of the collected notes shows that the delay in departure did not affect all species, but for several there was an exceptional number of late records. Birds which do not breed in southern Britain will be treated separately in the second part of this report, but of the breeding species the Yellow Wagtail provided the most striking example of delayed emigration: there were not less than thirty occurrences, some of considerable numbers, within the range of late dates given in *The Handbook of British Birds* (H. F. Witherby *et al.* 1938-41), though it should be added that there have been rather more October records of this species in several recent years than there were before 1940. Six or more " late dates " were added to those given in *The Handbook* for Sand Martin, Sedge Warbler and Reed Warbler, and there were several also for Common or Arctic Tern, Whinchat, Chiffchaff and Pied Flycatcher, while Swifts, Swallows and House Martins were seen later than usual in many districts. An analysis of the late dates given for summer-resident species in *The Handbook* for the years 1900 to 1937, inclusive, shows that a total of 13 was recorded in 1911, 12 in 1912, 11 in 1910, 10 in 1935, and from 0 to 9 in the other years. Even when allowance is made for the better cover of the country by bird-watchers and local reports in recent years it is clear that the number of delayed departures in 1954 was exceptional, and indeed probably unique in this century.

A short account of the weather conditions in the last four months of 1954, taken from the *Monthly Reports of the Meteorological Office,* will be given at the end of the second part of this paper. In brief, after a cool, wet, unsettled summer, the autumn of 1954 was generally mild, wet and stormy, with no prolonged period of anticyclonic conditions. It may be suggested that two factors were concerned in the large number of late occurrences of certain species: a hold-up of departures owing to the lack of favourable weather for migration, and a high rate of survival of lingering birds because of the absence of early frosts and consequent abundance, for the time of year, of insect food.

In the following summary of the more significant records for each species the normal time of departure is quoted from *The Handbook,* and details are given of any occurrences falling within the range of late dates given in that work.

COMMON SANDPIPER (*Tringa hypoleucos*).—" Single birds fairly often recorded in winter in various parts of England, Wales and Ireland. Emigration . . . to end September with stragglers to second week October." Late migrants or wintering birds were recorded as follows: One at Mucking, Essex, 7th November; one at Teesmouth, Durham, 24th and 31st October, 14th November; two on River Medina, Isle of Wight, 5th December; one at Egypt Bay and one at King's Ferry, Kent, in December; one at Chew Valley Reservoir, Somerset, 28th December; one on Taf Estuary, Carmarthenshire, 1st January 1955; singles wintered on Rivers Exe, Clyst, Tamar and Torridge in Devonshire.

COMMON TERN (*Sterna hirundo*) and ARCTIC TERN (*Sterna macrura*). Owing to the difficulty of identification of these species, especially in autumn, they are taken together. When the species has been stated this is given in brackets, but the writer of this paper has not seen evidence of identification in any case. It should be noted that a late date for a Common Tern (" passage south . . . to mid-October") is not necessarily one for an Arctic ("passage south . . . to second week October, with frequent stragglers to end of month "). Terns recorded as Common were seen in Lancashire on 16th October and in the Isle of Wight on the 17th.

23rd October: One on The Wash, Lincolnshire.
24th October: One on Cheddar Reservoir, Somerset.
27th October: One at Spurn Head, Yorkshire.
31st October: One (Arctic) at Hilbre Island, Cheshire.
7th November: One (Common) on River Yealm, Devon.
13th November: An immature off Joppa, near Edinburgh.
21st November: One at Blithfield Reservoir, Staffordshire.
5th December: One near Bridlington, Yorkshire.
19th to 21st December: One over Ramsgate Harbour, Kent.

LITTLE TERN (*Sterna albifrons*).—" Passage south . . . to end September with stragglers to first week October."

30th October: 3 seen at close range at Belvide, Staffordshire.

SANDWICH TERN (*Sterna sandvicensis*).—" Southward passage . . . to second week October."

23rd October: One or two in Welland Estuary, Lincolnshire.

TURTLE DOVE (*Streptopelia turtur*). — " Summer residents . . . leave early August to first week October."

21st October: One at Layer Breton, Essex.

5th November: 6 at New Mill End, Hertford-Bedfordshire border.

CUCKOO (*Cuculus canorus*). — " Adults . . . up to last week August. Juveniles leave during August and first half September."

2nd October: One at Kirby-le-Soken, Essex.

NIGHTJAR (*Caprimulgus europaeus*).—" Emigration . . . lasts to third or fourth week September." Single birds were recorded in Norfolk and Sussex on 26th and 28th September respectively, and one was identified " with little doubt " on Lundy on 22nd October.

SWIFT (*Apus apus*). — " Movement continues to end August, with frequent stragglers first half September and occasional ones to first week October." There were 8 records for the last week of September, including one in Northumberland on the 26th, and 5 for the first week of October.

16th October: One at Leicester.

19th October: One at Spurn Head, Yorkshire.

SWALLOW (*Hirundo rustica*).—" Passage and emigration continue to nearly end October. Stragglers frequent in November up to end third week. Very numerous isolated records after third week November, may relate to wintering birds." There were November occurrences in many parts of England and Wales, and the following single birds were recorded in December: On 1st and 3rd at Redcar, Yorkshire; on 4th at Skirlaugh, Yorkshire; on 5th at East Tilbury, Essex; on 8th at Lytham, Lancashire; on 31st near Berwick-on-Tweed.

HOUSE MARTIN (*Delichon urbica*).—" Emigration . . . lasts to third week October, stragglers frequent to mid-November and occasional to first week December." There were 19 November records, mostly single birds in the South and Midlands, but including one near Edinburgh on the 7th and 5 at Tenby, Pembrokeshire, on the 13th. Two were seen at Langley Point, Sussex, on 4th December, and two near Bridlington, Yorkshire, on the 5th.

[16th January 1955: Two almost certainly indentified off Sandbanks, Dorset.]

SAND MARTIN (*Riparia riparia*).—"Emigration . . . to end third week September. Stragglers frequent to mid-October." There were 6 records for the first half of October, including one in North Westmorland on the 13th.

16th October: 700 at Kingsdown, Kent, and 9 at Spurn Head, Yorkshire.
19th October: Last seen on Lundy, Devon.
20th October: One at Little Eaton, Derbyshire.
22nd October: 7 over Hove, Sussex.
26th October: One at Leewick, Essex.
30th October: 5 flying W.S.W. over Dungeness, Kent.
25th November: Two over Mansfield Camp, Uckfield, Sussex.

RING OUZEL (*Turdus torquatus*).—" Departure movements . . . continue to first week November. Records between mid-November and mid-February may relate to wintering birds." Single birds were seen in Sussex and Essex on 6th and 14th November respectively. One at Sevenoaks, Kent, on 6th December and one at Cliffe, Kent, on the 7th. An adult cock was seen on Staines Moor and near George VI Reservoir, Middlesex, from January to April 1955.

WHEATEAR (*Oenanthe oenanthe*).—" Movement . . up to third week October. Stragglers continue to pass in most years up to mid-November." There were four records for the first week of November.

19th November: One at Titchfield Haven, Hampshire.

WHINCHAT (*Saxicola rubetra*).—" Emigration . . . to fourth week September. Stragglers in most years to second week October."

16th October: One at Seaford, Sussex.
20th November: A female at St. Leonards, Sussex.
21st November: One at Bulverhithe, Sussex.

GRASSHOPPER WARBLER (*Locustella naevia*).—" Departure . . . lasts to end of September."
2nd October: One near Walmer Castle, Kent.

REED WARBLER (*Acrocephalus scirpaceus*).—" Departure . . . lasts to end September." A juvenile was still being fed by parents at Cley, Norfolk, in " early October."

2nd October: One on Cambridge Sewage Farm.
9th October: One on Lundy, Devon.
11th October: One on the Crumbles, Sussex.
13th October: One roosting in hedge at St. Osyth, Essex.

SEDGE WARBLER (*Acrocephalus schoenobaenus*).—" Departure . . . . . to end September."

2nd October: One on Farlington Marshes, Hampshire; one at Chart Sutton, Kent; one at Chesterton Fen, Cambridgeshire.

6th October: Two on Pett Level, Sussex.

9th October: One at Rodbourne Sewage Farm, near Swindon, Wiltshire.

There were up to three on the Crumbles, Sussex, during the first week of October, two on the 11th and 12th, one on the 14th.

GARDEN WARBLER (*Sylvia borin*).—" Southward movement . . . to first few days October. Occasional later stragglers October 9th—26th."

6th November: One caught at Spurn Head, Yorkshire.

WHITETHROAT (*Sylvia communis*).—" Southward movement . . lasts till mid-October. Stragglers recorded several times in November up to the 10th."

9th November: One at Hadleigh, Essex.

LESSER WHITETHROAT (*Sylvia curruca*). — " Southward movement . . . to first week October., stragglers frequent to mid-October."

12th—19th November: One seen on five of these days on Lundy, Devon.

24th November—10th December: One at North Fambridge, Essex. *The Handbook* gives only one later date.

WILLOW WARBLER (*Phylloscopus trochilus*). — " Very occasionally recorded in winter in England and Wales. Stragglers fairly frequent up to October 22nd."

25th October: One at Kirby-le-Soken, Essex.

15th December: One seen and heard at Scotton, near Knaresborough, Yorkshire.

CHIFFCHAFF (*Phylloscopus collybita*).—" Most years a few winter. Departure . . . . to mid-October." The following November records may be taken as late migrants rather than wintering birds: singles at Spurn, Yorkshire, on 1st, 7th and 13th, and at High Royd Sewage Farm, Yorkshire, on the 7th; odd birds in coastal areas of Sussex until the 14th; one at Horton, Buckinghamshire, on the 13th; one or two on Lundy, Devon, from the 10th to the 17th. On 11th December one was trapped at Dungeness, Kent, and one seen at Titchfield Haven, Hampshire. On 15th December one at South Norwood, Surrey; on the 26th one at Littlebourne, Kent. On 2nd January one at West Hyde, Hertfordshire, and one at Haverfield, Middlesex. One at Beddington, Surrey, 25th January to 12th February, and one at Lonsdale Road Reservoir, Surrey, from the end of January to mid-February.

SPOTTED FLYCATCHER (*Muscicapa striata*).—" Departure of summer-residents . . . . lasts to about mid-September. Passage migration to first few days October." There were six records in the first week of October: One at Shanklin, Isle of Wight, on the 2nd; one at Margaretting, Essex, on the 3rd; one at Rugeley, Staffordshire, on the 4th; one each at Lowestoft, Suffolk, and Blakeney, Norfolk, on the 5th, and two on Lundy, Devon, on the 7th.

PIED FLYCATCHER (*Muscicapa hypoleuca*). — " Departure of summer-residents to end August. Passage-migration . . . to end September."

3rd October: One at the Naze, Essex; 3 to 7 at Blakeney Point, Norfolk; 4 at Gibraltar Point, Lincolnshire.
Up to 8th October: " Seen frequently " on Lundy, Devon.
9th October: One at St. Catherine's Point, Isle of Wight.

YELLOW WAGTAIL (*Motacilla flava*).—" Departs mid-August to end of September." There were numerous records for October and one for November, as follows:

2nd October: One at Slough, Buckinghamshire; one at Checkley, Warwickshire.
3rd October: One at Osborne, Isle of Wight; one at Eye Brook Reservoir, Leicestershire.
4th October: One at Hockley Heath, Warwickshire; one each at Abberton Reservoir and Bishops Stortford Sewage Farm, Essex; one at Cley, Norfolk.
6th October: One at Wallingford Sewage Farm, Berkshire.
8th October: One at Abberton Reservoir, Essex.
9th October: 55 on Cowbit Marshes, Lincolnshire.
10th October: One on Walland Marsh, Kent; one at Sonning Eye, Oxfordshire.
12th October: One near Cambridge.
13th October: One at Snitterfield, Warwickshire.
15th October: One at Hove, Sussex; two at Ardleigh, near Colchester, Essex; one at St. Neots, Huntingdonshire.
17th October: 15 at Bere Ferrers, Devon; one at Newhaven and one on Seven Sisters, Sussex.
18th October: One at Reading, Berkshire.
21st October: Two near Rye, Sussex.
23rd October: One at Barrow Gurney Reservoirs, Somerset.
24th October: 3 at Fosdyke, Lincolnshire.
26th October: One at Perry Oaks Sewage Farm, Middlesex.
29th October: One at Coventry, Warwickshire.
30th October: One on Lundy, Devon; one at Titchfield Haven, Hampshire; one at Minworth, Warwickshire; one at Romford Sewage Farm, Essex.
4th November: Two at Guarlford Sewage Farm, Malvern, Worcestershire.

(*To be concluded*)

BIRDS OF A TRANS-ATLANTIC VOYAGE IN LATE SPRING 1954

By Agnes M. Thom

(*Fair Isle Bird Observatory*)

Although there are many papers concerning the birds observed during transects of the North Atlantic there is still room for advancement of our knowledge of seasonal distribution over this vast expanse of ocean. The present paper is offered as a contribution towards that end. The material is presented as a record, and no attempt has been made to analyse or discuss the results in the light of the conclusions reached by authorities such as Wynne-Edwards (1935) and Rankin and Duffey (1948).

The journey was made in S.S. Lismoria (8,000 tons approx.) between the evening of 27th May 1954, leaving the Clyde, and 4th June, arriving at Montreal. The observations accorded closely with the normal pattern for an east-to-west voyage at this season, the only important departure being the remarkable migration of Little Auks, which appears to have been unusually late. This may be connected with the fact that 1954 was a late ice year: we had near-arctic weather conditions during the later part of the voyage and bergs were reported to be in the vicinity of the ship.

WEATHER

The ship's mid-day positions and movements with regard to the ten-degree squares named by Nicholson (1951), together with brief notes on the weather conditions, are given below:

May 28th: 55°32′N., 11°30′W. Rockall Seas. Sunny, 3/8 cloud and fresh wind.

May 29th: 50°49′N. 22°29′W. Outer Bailey. Good vis., cloud 1/8, wind freshening during the day.

May 30th: 53°19′N. 31°59′W. Reykjanes Tongue. At 0800 hrs. sunny, cloud 3/8, fresh S.W. wind. By mid-day heavy rain with gale-force winds made observations impossible. Improvement by 1720 hrs.

May 31st: 51°09′N. 40°20′W. Cape Farewell Seas. Wind strong westerly at 1400 hrs., cloud 8/8. Heavy rain from 1500 hrs.

June 1st: 48°31′N. 48°30′W. Outer Bank. Overcast with mist and fresh wind, 0840 hrs. At 1100 hrs. wind strong N.W. and conditions arctic, temperature 41°F. Icebergs in proximity. Wind still strong N.W. at 1500 hrs., cloud 8/8 and perishingly cold. Observations ceased at 1730 hrs.

June 2nd: 46°22′N. 56°44′W. Newfoundland Bank. Calm, sunny morning, 3/8 cloud; coast of Newfoundland in distance.

June 3rd: 49°20′N. 65°13′W. St. Lawrence. Low cloud 8/8 and rain in morning, improving.

On the first evening visibility in the Clyde was poor and no worthwhile observations were made. 28th May was passed in a comparatively calm col with high pressure to the south and over the Scandinavian Peninsula and a depression well away to westward, south of Cape Farewell. We were in the outer perimeter of this low by mid-day on the 29th and a day later were fast moving into a deepening secondary which had developed over the

St. Lawrence 24 hours before. We passed through the rain-belt of its occluded front on the 30th and during the 31st sailed on the southern side of this system into westerly winds, with another low advancing towards us from arctic Canada. On 1st June we were in the southern quarter of this new system, with the wind veering north-west after the passing of a cold front, and temperatures 38-41°F. in the area. This depression had moved far to eastward by the 2nd and conditions showed much improvement with a moderate following wind and temperatures in the mid-forties.

DIRECTION OF FLIGHT

It was very noticeable that during the period of strong westerly winds which characterized the second half of the voyage all the birds observed in flight were moving parallel with the ship, i.e. westwards into the wind. This was so even with those species which one might reasonably have expected to see moving in some other direction—eastwards, for example, in the case of the Great Shearwater, or northwards in the case of the migrating Little Auks. This behaviour serves to emphasize that whereas movement down-wind best serves survival in the case of land-birds blown over this ocean (Williamson, 1954), exactly the opposite holds for sea-birds in rough weather, their most important need being to maintain sea-room and avoid being drifted on to a lee shore (Murphy, 1936).

SYSTEMATIC LIST

LEACH'S PETREL (*Oceanodroma leucorrhoa*). I saw only one type of small petrel during the crossing: the flight was the same in all cases, and sometimes I had clear views of rump and forked tail and generally brownish appearance. By no means all, or even most, were positively identifiable as belonging to this species, but all records of small petrels are included here. They were never following in the wake, and were generally picked up when I was looking at something else, as the waves were so rough that it was difficult to find them with the naked eye. They flew roughly parallel with the ship's course, in a generally westerly direction.

The first was seen at a distance, flitting over the waves, at noon on 31st May. Next day at 0840 hours 5 small petrels flew alongside the ship—one was well identified as Leach's—and at 0900 hours 15 were seen. Between 10 and 11 o'clock 7 were seen, followed by 2, and at 1110 hours 4 more, followed a little later by 2, again 2 at mid-day, and 3 shortly afterwards. A small petrel was seen shortly after 1400 hours followed by 2 a little later, and at 1450 hours by a definite Leach's. There were single birds about 1700 and 1730 hours.

Next day, 2nd June, a flock of *ca.* 30 petrels was seen just before mid-day; they rose from the water and circled round high up before coming down close to the surface again. At 1400 hours another flock of about 50 was seen behaving similarly, and a further flight was noticed at 1715 hours. At 1800 hours a lot of tiny black birds were seen at a distance, but they did not rise.

[MANX SHEARWATER (*Procellaria puffinus*). A single shearwater was noticed in a gathering of Fulmars which rose some way astern at 1720 hours on the 30th, at about 52°30′N. and just short of 35°W. It did not have a capped appearance, and was blackish above and white below and may have belonged to this species.]

GREAT SHEARWATER (*Procellaria gravis*). This was first noticed at 0830 hours on the 31st at about 38-39°W., a party of 14 passing alongside the ship: the capped head and the white mark on the rump were clearly visible. At 1145 hours, in Cape Farewell Seas, a flock of about 30 was seen, flying in a westerly direction. Several were showing signs of wing-moult (see Rankin and Duffey, 1948). Shortly afterwards a flock of 10 flew parallel to the ship, and another group of 10 was noted at 1215 hours. Just after 1400 there were first 3 Great Shearwaters, and then two flocks of about 30 and 50 flew alongside. The last observations of the day were made at 1435 hours and 1445 hours when one and 3 birds were seen. On 1st June, in Outer Bank at 0840 hours, a single bird was seen; and as we entered Newfoundland Bank in the evening 2 birds appeared at 1600 and 5 at 1710 hours.

On the return voyage, 13 Great Shearwaters were counted in a short period before noon on 10th August at about 53°06′N. 53°20′W.

FULMAR (*Fulmarus glacialis*). Fulmars following the ship on the first day numbered 5 or 6 at noon and fewer at 1530 hours. There were more next day, about 30 being counted around or following the vessel at 8 o'clock: they were the only birds seen on the 29th and their number varied only slightly. They were still at this strength on the morning of the 30th and had increased to about 50 in the late afternoon. There were a dozen only at 0830 hours on the 31st, but fewer later in the morning, and again a dozen or so at 1800 hours. On 1st June at 0840 hours the number was reduced by half, and one "blue" bird was seen. After lunch there were very few indeed. At 1445 hours a second "blue" put in an appearance and there was one at 1500—perhaps the same, although 2 were seen together at 1520 hours. The next morning, the 2nd, with the coast of Newfoundland visible in the distance, Fulmars were absent, and in fact none was seen that day.

GANNET (*Sula bassana*). A Gannet was observed flying to the north-east at 0730 hours on 28th May, and at 0840 hours a Gannet was seen astern. There were 2 at 10 o'clock, one at 1145, and 2 immatures in partially white plumage at 1245. No more were seen until 2 appeared, flying low over the waves, as we approached the St. Lawrence on the evening of 2nd June.

GREAT SKUA (*Stercorarius skua*). One was flying a short distance astern at 1130 hours on the 28th, the white wing-patch clearly visible. At 1010 hours on the 31st (south-west part of

Cape Farewell Seas) two dark birds with white wing-patches and slow continuous flapping flight were seen at a distance, and I believe these were Bonxies. Two similar birds, again not positively identified, were seen some distance from the ship after 1100 hours on 1st June.

Lesser Black-backed Gull (*Larus fuscus*). One was following the ship with the Fulmars on the evening of 28th May in West Rockall Seas.

Herring Gull (*Larus argentatus*). There were gulls of this species with the ship on the morning of 28th May but we lost them about 9 o'clock and no more were seen until the American side was reached. Six were following the vessel early in the morning of 2nd June off Newfoundland, and later 5 more appeared. In the afternoon 3 birds were present.

Kittiwake (*Rissa tridactyla*). Kittiwakes, about 20 in all, were following the ship on the first morning out. At mid-day, however, in Rockall Seas, only 8 were present, and by 1530 even they had disappeared. No more were seen until 3 immature birds appeared shortly after 10 o'clock on 1st June; at 1110 there were 4, and they were still with us at noon. An adult was next seen, and at 1400 hours 6 "tarrocks" were flying near the ship, and a little later 8 more appeared, plus another adult. At 1715 we had 2 adults and 3 tarrocks present. Six tarrocks flew by, a flock of 15 following shortly afterwards, when we were in sight of the Newfoundland coast early on 2nd June. In the St. Lawrence on the afternoon of the 3rd one adult and 2 immature birds were seen.

Little Auk (*Plautus alle*). On coming on deck after breakfast on 1st June, at about 0940 hours, I saw two flocks of Little Auks close to the ship, about 30 birds in one and 50 in the other. From then until 1300 hours I must have seen several thousand Little Auks; the sea was alive with them, and at times they circled quite high in the air, reminding me of flocks of small waders. It was quite impossible to count them, as whenever one tried to look at anything clouds of Little Auks passed in quick succession. Comparatively few were on the water—they were practically all flying in the same westerly direction as the ship was moving. Probably some 3,000-4,000 were seen during the morning—a remarkable sight! After lunch these vast numbers had vanished. One flock of *ca.* 30 was seen at 1400 hours soon followed by a small one of 7. The last were two flocks of about 30 and 20 just after 1430 hours. At 1645 hours on 2nd June 2 birds thought to be this species dived on the approach of the ship.

Unidentified larger auks, possibly Brünnich's Guillemot (*Uria lomvia*). The first auk (other than Little) was seen at 0840 hours on 1st June. In mid-morning 3 others were seen and just before mid-day 2 more flew past, with 4 others at noon. The next were 2 at 1515 hours and at about 1600 hours a flock of about 30 flew parallel with the ship, followed shortly by parties of 4 and 3, then a party of 3 which were definitely a species of guillemot as the bills were clearly seen. A single bird passed later, and at 1700 hours a flock of 16. Shortly afterwards there were 2 birds and another was seen at 1730 hours. On 4th June 4 auks were on the water at 1040 hours and rose when the ship approached.

ACKNOWLEDGEMENT

The observations were carried out at the suggestion of Mr. Kenneth Williamson, and I am grateful to him for assistance in preparing the material for publication.

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NOTES

Displacement coition in the Mallard.—On 10th May, 1951, at Clayton-le-dale, near Blackburn, Lancashire, I was engaged in watching the behaviour of a pair of Mallard (*Anas platyrhynchos*) tending fifteen young, which were newly hatched. The young fed for the most part within a radius of three yards of the female Mallard, but occasionally one strayed further afield. Immediately this happened, the male bird swam towards the young, seized it by the hind neck, and thrust it under the water, shaking it violently. The female, " quacking " loudly, then half-swam, half-fluttered across the water towards the male Mallard, who released the chick, and proceeded to chase the female, with outstretched neck, both birds " quacking " loudly.

Eventually, the male Mallard caught the female, and holding her by the hind neck, mounted her on the water, thrusting her beneath the surface. Coition lasted approximately 60 seconds, the heads of both male and female birds remaining submerged throughout the period. Releasing the female, the male swam round her in an arc of some 120°, with neck outstretched and slightly elevated.

This behaviour was observed on several subsequent occasions, and whenever a young bird strayed too far from the female Mallard. W. G. Hale

[Mr. Hale has kindly sent us a photograph showing the male with its head below the surface and the female completely submerged, but unfortunately this is not clear enough for reproduction.—Eds.]

Behaviour of Common Tern after eggs had been stolen.—The note on the behaviour of a Lapwing (*Vanellus vanellus*) after its eggs had been crushed (*antea*, vol. xlvii, p. 414) prompts me to record somewhat similar behaviour that took place when the eggs of a Common Tern (*Sterna hirundo*) had been eaten by a Black-headed Gull (*Larus ridibundus*).

On 16th June 1951, from my canvas hide on a sand-pit on the Eden Estuary in Fife, I saw a Black-headed Gull land at a Common Tern's nest containing 3 eggs, the owners of which were absent at the time. The gull commenced to eat the eggs and was allowed to do so by other terns nesting nearby. Eventually it was chased off by the owner who then came back and landed by its nest, but almost immediately flew off again uttering a loud, screaming " kee-arr." About 30 seconds later it returned, landing some three or four yards from the nest. It walked quickly towards this, but when it reached it, the bird turned immediately and walked away again in a somewhat agitated manner. It did this several times and then flew off. About a minute later it returned, went straight to the nest, picked up a piece of egg-shell and flew off. In about a half-minute it came back with empty bill, picked up another piece of shell and again took it away. Having disposed of this the bird returned, stood by the nest for half-a-minute or so and then flew off once more. It did not return during the next ten minutes after which I left the hide to examine the nest. This was found to contain the broken remains of two eggs. The following morning these pieces of shell had gone, but the nest was not used again.

J. GRIERSON

Aquatic Warbler in Dorset.—An Aquatic Warbler (*Acrocephalus paludicola*) was discovered at Portland Bill, Dorset, at midday on 11th October 1955. At first sight, as the bird flew off out of thick cover, the tail-pattern suggested that it was not a Sedge Warbler (*A. schoenobaenus*). This was later seen to be due to the streaked rump, which gave rise to a contrast in shade between the tail and upper-parts, instead of between the tail *and* rump with the rest of the upper-parts as in the latter species. The pale median crown-streak was clearly seen when the bird settled. In flight it appeared altogether yellower, and more streaked on the upper-parts than a Sedge Warbler.

The bird was trapped on the following day by my wife with J. A. Wigzell and Alan Till, and a full transcription of the information noted then in the Observatory records has been sent to the Editors of *British Birds*. Its weight was 19.6 gm. It was judged to be a first-winter bird on account of the prominent dark speckles on its breast. This is only the second record of this species from Dorset.

JOHN ASH

Subalpine Warbler in Norfolk.—At about 11.30 a.m. on 29th September 1955 at The Hood, Blakeney Point, Norfolk, we had excellent views of a Subalpine Warbler (*Sylvia cantillans*). Although skulking, the bird was tame and allowed us to approach quite closely. After one unsuccessful attempt it was trapped and its plumage compared with the description noted while we were watching it. After examination it was released. Later it was trapped again by R. A. Richardson who ringed it and made detailed notes of its plumage. We understand that the bird was still present on 30th September, but that it could not be found on the following day. The following is a description of the bird. Smaller than a Whitethroat (*Sylvia communis*) and resembling a Dartford Warbler (*Sylvia undata*) in general shape and in flight although it had a noticeably shorter tail than the latter species. The tail was frequently cocked slightly and appeared rounded when spread. Whole of the upper-parts blue-grey, brighter on the head, the mantle and rump being tinged brownish. The blue-grey colour extended below the eye. In direct sunlight the colour of the upper-parts reminded us of the back of a Nuthatch (*Sitta europaea*). Tail dark greyish-black with noticeably white outer feathers. Wing-feathers grey-brown, with paler edges. Chin pinkish-buff; throat, upper breast and flanks orange-buff. There was a marked whitish moustachial stripe. Belly and under tail-coverts greyish-white. Bill grey. Legs light brown. At times the eye appeared a brilliant red. At close range, however, it seemed more brownish and it showed as this colour in the hand. A ring round the eye appeared buff-white but on the captured bird it was pinkish. The bird was silent except that once while in the hand it uttered a quiet " tee-tee."

G. H. Acklam, John Shepperd and R. A. L. Sutton

[Mr. R. A. Richardson has kindly sent us a summary of his notes on this bird which was also seen by Mrs. M. Meiklejohn, Miss D. Steinthal and Messrs. P. R. Clarke, P. D. Kirby and P. F. Le Brocq, among others. The detailed plumage description, taken in the hand, fully confirms the identification of this, the second record for England; the first, an adult male, was seen at Cley on 11th June 1951 by P. J. Hayman and R. A. Richardson (*antea*, vol. xlv, p. 262). The 1955 bird was considered to be a first-winter male. When trapped it weighed 8.17 gm.—Eds.]

Starlings attacking field mouse. — On 4th April 1952 a group of five Starlings (*Sturnus vulgaris*) were seen to be mobbing some object on a lawn. Investigation revealed a Long-tailed Field Mouse (*Apodemus sylvaticus*) in either a sickly condition or so damaged by the birds' attacks that it was unable to escape. The mouse was put in a box but died shortly afterwards. R. G. Finnis

REVIEW

THE GOLDEN EAGLE: KING OF BIRDS. By SETON GORDON, C.B.E. (*Collins* "New Naturalist," London, 1955). 246 pages, 17 photographs. 16s.

A MONOGRAPH on the Golden Eagle in Scotland is long overdue and who could have produced a better one than Seton Gordon? For half a century the author has studied and written about eagles, and now *The Golden Eagle: King of Birds* summarizes this work of a life-time. Seton Gordon, as always, has an eye for atmosphere; and the special atmosphere of the Golden Eagle and the countryside in which it lives comes over vividly. The author rarely states precisely where his eyries are, but again and again one realizes that one knows the very spot—the eyrie high on the forbidding crag in North Harris, and the other where three eaglets were reared for several years running.

The first half of the book deals with topics and includes the Golden Eagle in winter and in falconry, its food, nesting and hunting habits, flight and enemies. The author, like his subject, ranges far and he has collected much information, published and unpublished, on Golden Eagles in other lands. The remainder of the book describes personal observations at eyries: at one, the author and his wife spent 500 hours over several seasons; at another, the author has kept one pair under observation for 8 years. The book is illustrated by many excellent photographs by the author and others. There is an appendix on races of the Golden Eagle and on its status in many countries. A bibliography lists some quite obscure publications, but does not include two notes in *The Scottish Naturalist* on the food of eagles in south-west Scotland.

A formidable list of prey found in eyries throughout the Golden Eagle's range is given and it includes such oddities as grasshoppers, salmon, rattlesnake, skylark and porcupine. But the prey commonly taken in different countries is similar, ground rodents being preferred. In Scotland, mountain hares, rabbits and grouse are taken in that order of frequency. Regional differences in the food are hinted at but not discussed.

The weight-lifting capacity of a given eagle varies greatly with the strength of wind and up-currents. In Scotland, hares are usually dismembered before being brought to the eyrie, presumably since they are too heavy for most eagles; in contrast, young hares and rabbits are brought in intact. The strength of Golden Eagles varies regionally with their size: the eagle of the Hebrides is smaller than that of the mainland, the smallest race of all is found in Japan and the largest, the female of which is flown from the wrist at wolves, in Turkestan.

Seton Gordon makes no attempt to minimize the killing of lambs by eagles in Scotland, but states that from more than 60 correspondents, all of whom live and work in eagle country, he has received accounts of only 12 authentic *instances* of eagles seen taking live lambs. He has only 2 personal records of live lambs being taken. The author concludes that only when natural food is scarce do eagles take to lamb killing, and with some it then becomes a habit.

Golden Eagles are strictly territorial in the breeding season but less so in winter. Territory size may be as little as 5,000 acres. The eaglet remains with its parents until late autumn when it normally leaves or is driven from the territory. Most pairs of eagles are sedentary, but some disappear from the nesting site for several weeks each year. The author is convinced that an eagle which escapes trapping or poisoning may live to be 100 years in the wild.

A chapter is devoted to the enemies of the Golden Eagle—which means an account of man's efforts to destroy it. Of 11 European countries in which the species nests, it is protected in only 4; in at least 4 countries the numbers are decreasing. In Texas, where intensive sheep farming attracts eagles from afar, one hunter in 8 years has killed 8,300 Golden Eagles from an aeroplane.

This book by a veteran field naturalist summarizes all that is known about Golden Eagles in Scotland but the author carefully points out that much more remains to be learned. The value of the book is twofold: it gives a wealth of readable information on the Golden Eagle, but it shows too where knowledge is lacking.

J. D. LOCKIE

LETTER

CENSUS OF BREEDING GREAT BLACK-BACKED GULLS

SIRS,—A census of breeding Great Black-backed Gulls (*Larus marinus*) in England and Wales in 1956 has been approved as an investigation of the British Trust for Ornithology. As organiser I shall be glad of offers of help from those who are willing to undertake the field work in their own areas, or other localities familiar to them. Negative reports from parts of the coast where it is known that Great Black-backed Gulls do not breed are also requested.

Will volunteers please communicate with me at South Mullock, Haverfordwest, Pembrokeshire? T. A. W. DAVIS

[We hope that everyone who is able to help will contact Mr. Davis, for only in this way can complete coverage be possible.—EDS.]

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Cover photograph by Eric Hosking: Carrion Crow (*Corvus corone*) at nest.

IMPORTANT : Please note the change of Editorial Address as from 25th April 1956

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MARCH
1956

BRITISH BIRDS

THICK-BILLED WARBLER AT FAIR ISLE: A NEW BRITISH BIRD

By Kenneth Williamson, Valerie M. Thom (*Fair Isle Bird Observatory*), I. J. Ferguson-Lees and H. E. Axell

An example of the Thick-billed Warbler (*Phragmaticola aedon*), a bird from south-east Asia and apparently the first of its species to be recorded in Europe, was captured at Fair Isle on 6th October 1955.

In the fleeting glimpses we obtained of this bird in the field its large size and long, rounded tail at once attracted attention. The rufous rump, contrasting with the uniform olive-brown of the mantle and wings was a conspicuous feature, much more striking in the field than in the hand. In all these characteristics the bird strongly resembled a Great Reed Warbler (*Acrocephalus arundinaceus*). When flushed from the turnip rig in which it was found the bird immediately dived again into cover, and on next being disturbed flew to a dense growth of reedy grass and *Heracleum sphondylium* on the banks of a near-by burn. Its skulking behaviour as it crept between the stems suggested that an attempt to trap it at this site might prove successful, so the Yeoman net with a portable catching-box was assembled, giving a trap with an entrance less than 3 feet wide. With great caution the bird was moved from the turnips to the ditch, where it threaded its way through the vegetation until finally it was fluttering against the glass of the box.

The bird was taken to the laboratory for examination: there it was seen that the resemblance to a Great Reed Warbler was purely superficial, and confined to size and plumage. There was no eye-stripe; the bill was very different from that of an *Acrocephalus*, being shorter and deeper, with the culmen distinctly down-curved; and the wing-formula too was quite different, particularly in the shape of the 1st primary which was unusually long and quite exceptionally broad. The bird was identified as a Thick-billed Warbler with the aid of Dresser's *Manual of Palaearctic Birds* (1902) and Hartert's *Die Vögel der Paläarktischen Fauna* (1910)

The upper-parts were bright olive-brown, the rump having a decidedly rufous tinge. The chin and throat were yellowish-white, and the breast, flanks and under tail-coverts washed with buff. Lores greyish. Wing dark brown, the primaries fringed olivaceous, the secondaries with rufous edgings. Axillaries and under wing-coverts buffish-white. Tail of 12 feathers, the outer pair 18 mm. shorter and the penultimate pair 8 mm. shorter than the longest feathers. Upper mandible dark brown, the lower flesh-coloured; 4 rictal bristles. Legs bluish, inclining to purplish on the sides of the tarsi, toes blue. Iris olive-brown, eye-lid plumbeous.

Measurements : Chord of wing 79 mm. Bill from skull 16½ mm., and 6 mm. in depth at the nostrils. Tarsus 29½ mm. Tail 78 mm. Weight 22.84 gm.

Wing-formula: 3rd primary longest, 4th slightly shorter, both emarginate. Next in order of succession were the 5th, 6th, 2nd, 7th and 8th, shorter by 3, 6, 7, 9 and 12 mm. respectively. Broad 1st primary 8 mm. longer than longest primary-covert.

No ectoparasites were found on examination with chloroform vapour. The bird was ringed and after photographs had been taken by Dr. Maeve Rusk, William Eunson and K.W. it was released. For a short time it skulked in the garden in front of the Observatory "Heligoland," and then flew low and swiftly—a very rufous-looking bird—to some crags on the hillside above.

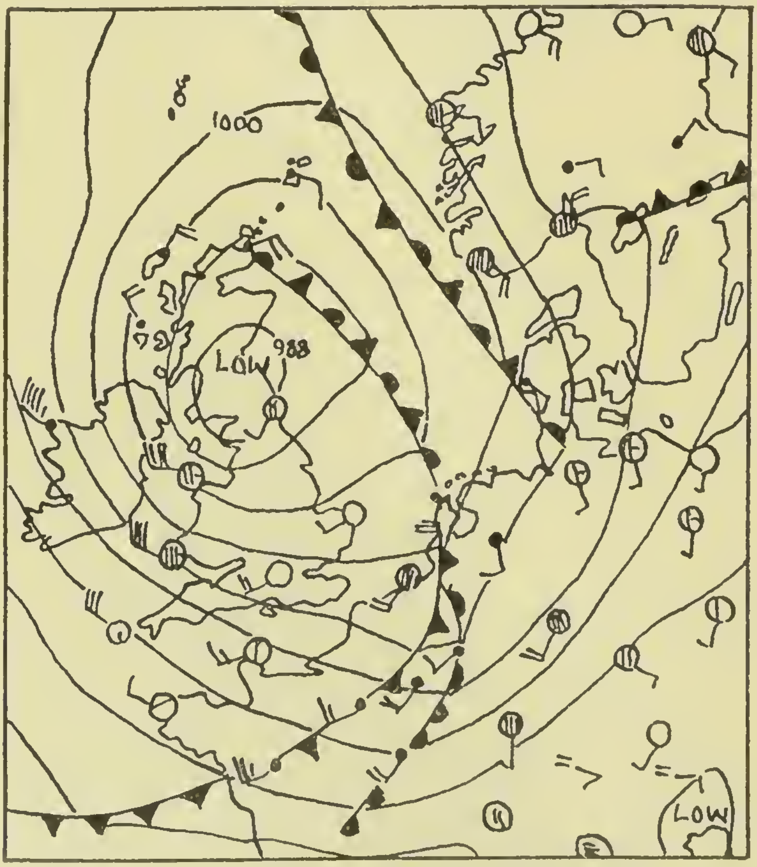

Fig. 1—Weather-conditions over western Europe at midnight on 5th/6th October 1955, the night before the capture of the Thick-billed Warbler (*Phragmaticola aedon*) on Fair Isle

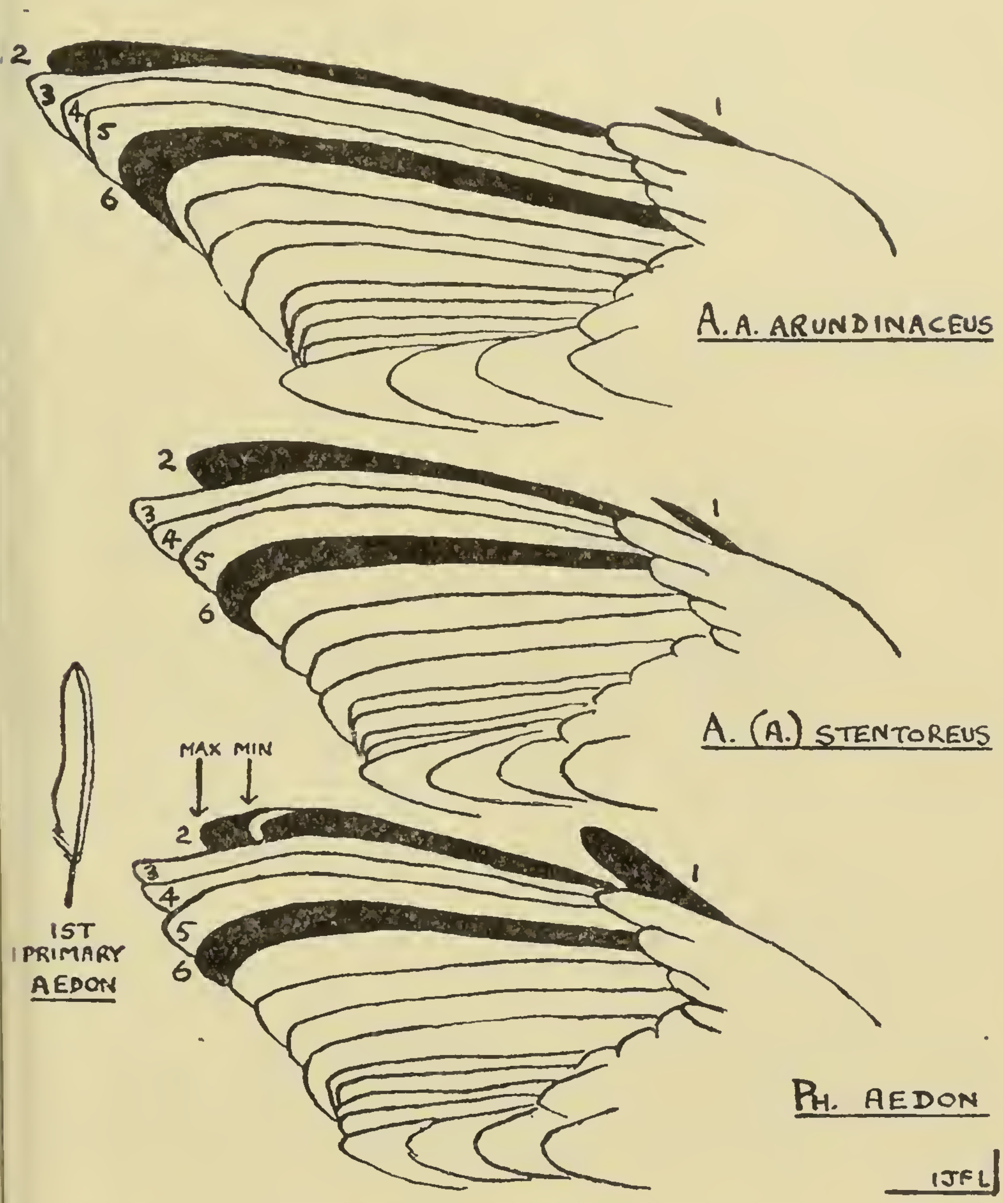

Fig. 2—Wing-formulae of three similar warblers: Great Reed (*Acrocephalus arundinaceus*), Clamorous Reed (*A.* (*arundinaceus*) *stentoreus*) and Thick-billed (*Phragmaticola aedon*)

The Thick-billed Warbler's important characters of a much larger first primary and shorter second primary are shown up in black and the length of the latter in each species is indicated by its relationship to the sixth primary which is also blacked out. In the Thick-billed Warbler the second primary may be as long as the sixth or as short as the eighth. These diagrammatic sketches are approximately natural size, so that the separate drawing of an average first primary of *Ph. aedon* shows the true size and shape. The so-called Clamorous Reed Warbler, from Egypt and further east, is variously regarded as a race of *arundinaceus* or as forming a superspecies with *arundinaceus* and *orientalis* (the Eastern Great Reed Warbler).

The Thick-billed Warbler was part of a considerable drift-movement which involved a "rush" of Turdidae and *Fringilla* spp., in addition to a small number of departing summer visitors among which Whinchats (*Saxicola rubetra*) and Blackcaps (*Sylvia atricapilla*) were dominant. A vigorous depression moved quickly eastwards across southern Scotland into the North Sea, its occluded front and associated rain-belt extending south-eastwards from Caithness to the Hook of Holland at midnight (Fig. 1). The bulk of this drift must have taken place off the continental coastline from Holland and the Frisian Islands north to the Heligoland Bight, between this occlusion and a quasi-stationary front across the entrance to the Skagerrak. Farther than this it is quite impossible to trace the migration of this warbler, but it is worth while noting that an extensive belt of high pressure had been established across eastern Europe and central Asia for the fortnight before 6th October.

ADDITIONAL NOTES ON THE SPECIES

As we have already remarked, the Thick-billed is in the field very similar in size, shape and coloration to the Great Reed Warbler and though it has a deeper and shorter bill, a tail longer in proportion, a redder rump, blue legs and lacks an eye-stripe, it would, in our opinion, often be very difficult to distinguish. In the hand, however, the bill-shape is distinctive, while the proportionate lengths of tail and wing and the very long, broad, rounded first primary are quite diagnostic (see Fig. 2).

It is generally recognized that there are two races of the Thick-billed Warbler, the typical form breeding in southern Siberia and Mongolia, and the other, *Ph. a. rufescens*, in Manchuria, north-east China and Japan. The latter form is smaller and darker and, at least in summer plumage, more rufous than *Ph. a. aedon*. The winter-quarters are in east India, Burma, Indo-China and the Andaman Islands (see Fig. 3). According to the information given by E. S. Ptushenko in *The Birds of the Soviet Union* (Vol. VI, pp. 234-238), the species inhabits damp areas where it is to be found in thickets of bushes among high grass. The eastern race is also recorded in drier, more open areas, however, and even in village gardens.

The nests are built from mid-June onwards in birches, osiers, or spiraea, 18 inches to 5 feet from the ground, in a fork or attached to several thin twigs. This bird thus builds rather higher than, and in slightly different situations from, the reed- and sedge-warblers (*Acrocephalus* spp.) which are its nearest relatives in Europe. The nest is lightly built of dry grasses and gives an appearance of untidiness from the outside, but the cup is neatly finished and lined with fine grasses and occasionally horse hair. 4-6 eggs are laid, and these are usually of a striking rose or violet colour, thickly covered with "veins" or "twisted lines" of black, brown or yellowish-rufous markings. They are about the size of those of the Great Reed Warbler. Nothing appears to be known about the incubation or fledging periods of this species, and very little about its food other than that it consists of insects.

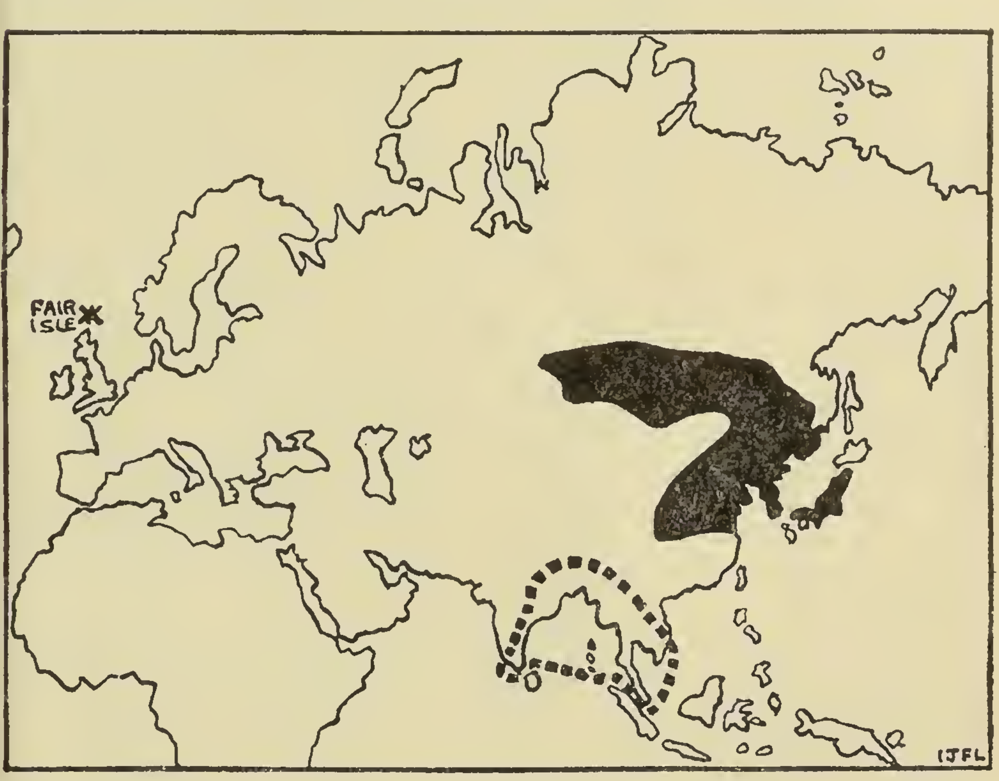

Fig. 3—The distribution of the Thick-billed Warbler
(*Phragmaticola aedon*)

The breeding range is indicated by the black area and the winter-quarters by being enclosed with a dotted line. The map is based largely on information given by E. S. Ptushenko in *The Birds of the Soviet Union*, Vol. VI, with modifications in the outline of the winter range based on other authorities.

The song, which is uttered from the tops of trees or bushes, is loud and is said to contain imitations of other species. It is described as "partly reminiscent" of the song of the Icterine Warbler (*Hippolais icterina*), though some loud, flute-like notes are similar to those of the Nightingale (*Luscinia megarhynchos*). The alarm call of the male is a loud and harsh "chok-chok," sometimes passing into a chattering "chok-chok-cherrerrek-chok."

The authors wish to express their gratitude to D. D. Harber for translation from the Russian of certain passages in *The Birds of the Soviet Union*.

MELODIOUS WARBLER AND LESSER GREY SHRIKES AT FAIR ISLE

By Kenneth Williamson
(*Fair Isle Bird Observatory*)

A small migratory movement of unusual interest reached Fair Isle on 16th September 1955, perhaps coming in from Shetland under fine col conditions overnight, but almost certainly introduced to the area by cyclonic drift due to a depression which was centred near Denmark from the night of the 13th-14th. Very few Passerines were concerned, but among them were four southern elements, two of which are of outstanding rarity so far to the north as Fair Isle.

Fair Isle's first-recorded Melodious Warbler (*Hippolais polyglotta*) was trapped in mid-morning, and at the same time an adult female Lesser Grey Shrike (*Lanius minor*) was found near the perimeter wall of the cultivated area. Another adult female Lesser Grey Shrike was captured at the south end of the isle on the following afternoon (the 17th): the first remained in the area where it was first seen until the 19th. Two Barred Warblers (*Sylvia nisoria*) were also ringed on the 16th (and one on the 15th), and a Wood Warbler (*Phylloscopus sibilatrix*)—a "south-east migrant" very rare at Fair Isle in autumn—was seen above the east cliffs.

There is one previous record of a Melodious Warbler in Scotland, at the Isle of May on 27th September 1913; the present occurrence may well be the farthest north recorded for this species, which breeds in France and the Iberian Peninsula and would be expected to occur most regularly as a vagrant in the Irish Sea region, following anticyclonic drift over sea-areas Biscay and Sole in the south-easterly airflow of Mediterranean highs. The Lesser Grey Shrike, which does not breed so far north in France but extends eastwards across Germany, has 9 previous records in Scotland, 7 of these being at Fair Isle: none has come to our notice, however, since the Bird Observatory began its work in 1948.

It seems highly probable that these birds must have travelled to the north out of eastern France and southern Germany ahead of the active cold front of the depression as it pivoted north-eastwards on its centre in Demark (Fig. 1), being brought ultimately within the influence of the cyclonic easterly winds crossing Forties on the northern side of the low. No other explanation for this remarkable movement seems possible, and the case is unique among the many synoptic situations studied during the past six years in that it indicates a long *overland* drift down-wind in the opposite direction of the true migration. Though this deflection overland, caused by the rain and low visibility at the front, is in this instance a matter of a few hundred miles, the case throws some light on the nature of the conditions which could contribute to trans-continental vagrancy from much farther afield; similar frontal developments might conceivably assist the westwards drift of many Siberian vagrants over a considerable part of their course.

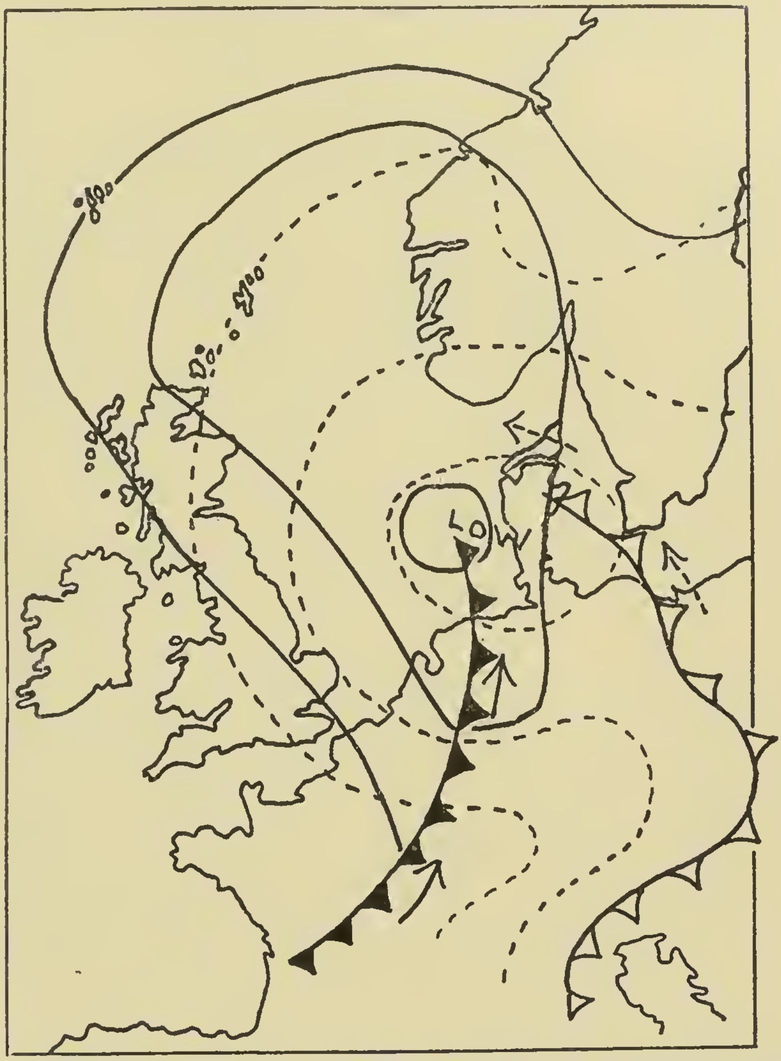

FIG. 1—TO SHOW OVERLAND DRIFT OF MELODIOUS WARBLER (*Hippolais polyglotta*) AND LESSER GREY SHRIKES (*Lanius minor*) RECORDED AT FAIR ISLE ON 16TH SEPTEMBER 1955

The figure shows the position of the cold front on the night of 13th/14th September (black symbols) and its situation 24 hours later (open symbols). The arrows indicate the general trend of the airstream ahead of the front. Data from *The Daily Weather Report* of the Meteorological Office of the Air Ministry.

Detailed notes on the birds are given below:

MELODIOUS WARBLER.—In the field, a small compact warbler with a strongly-made bill, olive-brown upper-parts and very pale yellowish beneath: no supercilium, and no obvious wing-markings. In the hand the secondaries were seen to have narrow fringes somewhat paler than the brown flight-feathers, but these did not form a pale bar or patch in the closed wing as in the Icterine Warbler (*H. icterina*)—see pp. 119. *Measurements :* Chord of wing, 66 mm.; bill from skull, 16 mm.; tarsus, 22½ mm.; tail, 53 mm. *Wing-formula :* 1st primary 4 mm. longer than primary coverts; 2nd 4 mm. shorter than 3rd and 4th, which were equal and longest; 5th-9th shorter by 1, 4, 8, 10 and 11½ mm. successively; emargination 3rd-5th. *Weight :* 11.33 gm.

Lesser Grey Shrike.—The bird seen on the 16th at once appealed to me as looking very different in build and stance from the Great Grey Shrikes (*L. excubitor*) which visit us each autumn. Besides appearing somewhat smaller and shorter in the tail, the bird adopted a more upright posture when perching on walls, fences and the telephone wires from which it watched for insect prey. I could make out no black on the forehead even with a fairly close view (*ca.* 40 yards) in excellent light, but there was no narrow white line dividing the black band of lores and ear-coverts from the grey crown, and no white fringes to the scapulars. The under-parts were flushed with pink, strongly so in a dull light, but not more so than in some Great Grey Shrikes I have seen (particularly an adult male present at the isle during 20th-22nd October 1955); some identification books appear to regard the pink tinge as diagnostic of the Lesser Grey. Later in the day the bird was seen at close quarters by Miss V. M. Thom and others, and they reported the presence of a few blackish spots above the bill.

The example trapped on the 17th was not in such immaculate plumage; the under-parts seemed duller and there was an irregular but nevertheless very pronounced blackish band across the forehead bridging the black eye-stripes. The wings were very worn.

It may be added that a third Lesser Grey Shrike, a 1st-winter bird with grey-brown upper-parts and no black on lores or forehead, was self-caught in the Gully Trap early on 8th October. This followed a similar frontal movement in Germany, with a centre of low pressure in the North Sea, on 6th-7th October (see pp. 92). The bird was examined by I. J. Ferguson-Lees, H. E. Axell and Miss V. M. Thom in addition to the writer. Details of both birds are given in the Table below.

Table—Structural details of Lesser Grey Shrikes (*Lanius minor*) trapped at Fair Isle

Character	Adult ♀	1st-winter
(Measurements in mm.)		
Chord of wing	115	109
Bill from skull	18½	19
Tarsus	26	26½
Tail	88	87
Weight in gm.	48.35	36.72
Wing-formula:		
1st primary (from p. coverts)	+3	=
Longest primary	3rd	3rd
2nd shorter by	2	4
4th ,, ,,	3	3
5th ,, ,,	11	9
6th ,, ,,	18	14
7th ,, ,,	23	20
8th ,, ,,	?	25
Emargination on	3rd, 4th	3rd, 4th

THE AMATEUR AND THE STUDY OF BIRD DISPLAY

SUGGESTIONS FOR FURTHER WORK*

By Edward A. Armstrong

Twenty-five years ago ornithological field-studies in this country were almost exclusively the concern of amateurs. The publication of *The Handbook* (1938-44)—the most notable corporate achievement of amateur ornithology—marked the epoch when the value of studying bird behaviour began to be appreciated in scientific circles, although the growth of ornithological professionalism was delayed until immediately after the Second World War. The way had been prepared by a notable succession of naturalists, including Turner, Ray, White, Newton, Selous and Howard. Mention must be made of *The British Bird Book* (1911-1913) which contained the best series of life-history studies published in this country up to that time. F. B. Kirkman, who edited it, was one of the first British ornithologists to appreciate the importance of supplementing field-observation with experimental work. He used still and motion photography to record his results and it is noteworthy that some prominent bird-photographers were among those who contributed articles to these volumes. If the appearances of compendious publications on birds are to be considered mile-stones marking the advance of British ornithology during a century, the outstanding works are the books by Macgillivray (1837-52) and Yarrell (1837-43) respectively, both entitled *A History of British Birds,* the *Dictionary of Birds* by Newton and Gadow (1896), *The British Bird Book* and *The Handbook.*

The ornithologically favourable situation of these islands, our sporting tradition, the work achieved by generations of naturalists on the identification of our avifauna and the improvement in field-glasses, prepared the way for the two great observers of the beginning of this century—Selous, the investigator of sexual selection, the discoverer of displacement activities, a man dedicated to the conviction that no item of bird behaviour could be too trivial for scrutiny, and Howard, whose name will always be associated with the territory theory—which still remains a subject of profitable controversy. They stand out as almost the last of the great ornithological individualists and the initiators of bird-watching in the modern style.

The study of ethology, the science of behaviour, is now fully established in a number of countries with a professionalism of its own. Any attempt to suggest aspects of bird display deserving of the amateur's attention must take account of this development. Now, should he wish to embark on serious study of a species or a problem he must acquaint himself with a considerable literature, often in several languages. He must also know something of modern techniques. The crucial distinction between the professional and the amateur is not that one is paid for his work and the other is unpaid but that the professional is able, on the whole, to look at birds when he wants to, while the amateur has to bird-watch in the time left over from other commitments. Thus all but the few whose conditions of employment permit extensive holidays and the still smaller number whose time is their own are precluded from most tasks which involve long-term, frequent and regular observations. It would be advantageous to society if more grants were available for amateur scientists to pursue specific research. Thus something might be done to prevent the widening of the gulf between the scientist and the public. Ornithology is still one of the scientific disciplines in which amateurs and professionals can understand and respect each other's contributions but the rapid advance of ethology may soon lead to a stage when the issues involved and the terminology employed are outside the average layman's comprehension. However, good work may still be done by busy people who deploy their leisure carefully and do not set themselves tasks beyond their capacity.

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* Mr. Armstrong's comprehensive review has been made at the request of the Editors as part of a reappraisal of the state of knowledge regarding various aspects of British ornithology. It is intended to publish similar reviews on other aspects in due course.—Eds.

The outstanding advantage enjoyed by the amateur, which he need never lose, is that he is much commoner than the professional. Perhaps his main contribution in the future will be through co-operation in corporate schemes, though it will be a sad day if he ever feels himself to be but a hewer of wood and drawer of water for others. It is to be hoped that the historian of ornithology 25 or 50 years hence will not have to record the virtual disappearance of the individualist observer. The professional has often acknowledged the achievements of the amateur naturalist. For example, Beirne (1952) discussing the history of the British fauna, remarks: "Adequate information on the bionomics, taxonomy and distribution of individual species is available only for those animals which . . . have attracted most attention from non-professional naturalists."

TECHNIQUE

Bird-watching techniques are so well known that little comment is needed. Experiments with stuffed specimens, models and mirrors are useful but difficult to interpret unless made on a considerable scale. Perhaps because of the expense involved, cinematography, especially "slow-motion," has not been used enough in the study of bird displays. Electronic flash photography can portray postures admirably but needs to be supplemented by motion pictures. On the breeding-grounds of social-nesting species substantial semi-permanent hides are useful. Sound records of utterances are not only of value for their own sake but may sometimes be used in conjunction with a model to attract males of the species to sing and display. It is preferable, of course, to study identifiable ringed individuals. Much may be learned concerning behaviour by keeping birds in aviaries.

LIFE-HISTORY STUDIES AND DISPLAY

The study of display should be closely related to life-history studies. Here the amateur sometimes enjoys advantages denied to the professional, who is often preoccupied with specialized problems. Many amateurs reside where an interesting and little-studied species is available, or, it may be, in or near an area particularly favourable for special studies, as, for example, where birds which usually breed in lofty trees nest in lower situations or where cliff- or island-nesting species are particularly accessible. Not many professional ornithologists have been able to concentrate on life-history studies involving years of observation. Any amateur embarking on the intensive study of a species should make enquiries as to what work has been done, or is contemplated, on it. The B.T.O. might be used as a clearing-house for such information. As comparative studies of the behaviour of related species are of particular interest to the professional, who is specially equipped to carry them out, the amateur would usually be well advised to choose species belonging to families not well represented in this country unless his work can be made ancillary to a larger scheme. The bird-watcher abroad enjoys special opportunities. Probably the real future of amateur ornithology lies with those not permanently resident in these islands.

THE ANALYSIS OF BEHAVIOUR

Three aspects of a bird's display are of special interest—how it has evolved, what function it serves and what causal factors are involved. Although the average bird-watcher may not wish to go deeply into these matters his observations will be more effective if he bears these angles of approach in mind. He should describe what he sees so that his account can be compared in detail with the displays of other species, and his notes will be all the more valuable if he has some comparative knowledge. Similarly, realising that display is essentially a signalling code, he will be interested in recording, not only the type of posturing performed by the bird but its place in a sequence and the reaction of the bird perceiving it. Thirdly, he will consider of what components a display is composed. In practice, each of these ways of regarding display illuminates the others. The observer's problem is to be candid and unprejudiced as to the facts while cherishing concepts, but not preconceived ideas, as to their significance.

The technique of observing display analytically cannot be described here. Much can be learned from papers in recent volumes of the ornithological journals and the *British Journal of Animal Behaviour.* No serious student can afford to neglect the journal *Behaviour.* Ethological studies are progressing so rapidly that theories and concepts are constantly under review. Few writers on the subject would be prepared to sponsor wholeheartedly the theories and opinions they put forward a few years ago.

Some comments seem desirable on the forms and components of display in order to indicate modern methods of study. Display may conveniently be divided into the categories, Sexual, Threat, and Distraction or Diversionary. Each of these types is probably the product of mixed motivation or a conflict of tendencies. The sources of displays are believed to be, for the most part, movements, such as "intention movements"—incomplete or checked activities—various "out of context" activities called "transference" (Armstrong, 1952; in press) or "re-direction" activities (Bastock *et al.,* 1953), and various movements due to high intensity drives (Moynihan, 1955a). Definitive formulation of these concepts awaits further clarification of the nature of these activities. The observer of a display should try to identify its sources and constituents but caution is necessary in reaching conclusions.

SEXUAL OR EPIGAMIC DISPLAY

The sources of sexual display appear to be attack, retreat and sexual motivations. The relative strength of these tendencies varies in different species and according to circumstances. It should be borne in mind that some displays which deter males attract females. Hinde's study of finch courtship (1955-56) exemplifies the technique by which components of such displays may be identified.

Certain aspects of sexual display which seem particularly worthy of the amateur's attention are mentioned below.

Aerial displays and song-flights. These, and aquatic displays, can seldom be studied in captive birds and so it is important that the field-naturalist should study them. Flight-displays, many of which have threat significance, are probably commoner than is generally realized. Aspects of interest are: (1) the relationship of display-flight to territorialism and the female; (2) the frequency and seasonal incidence of display-flight; (3) the relation between aerial display, coloration and habitat. The display-flights of many species, especially most of the birds of prey, are imperfectly known and the exact significance of aerial chases, especially when more than two birds are involved, needs investigation. It is important to determine whether in sexual chases the female is enticing the male rather than the ardent male harrying the female.

Aquatic displays. Few aquatic displays have been thoroughly studied. Thus, although several able ornithologists have attentively observed the Red-throated Diver (*Gavia stellata*) in the breeding-season a modern analysis of its remarkable antics is still needed. Comparatively little is known of the "moving lek" of some ducks, and other communal activities of aquatic birds, such as the "water-dances" of the Black Guillemot (*Uria grylle*). Incidently, it may be remarked that one of the great difficulties involved in mentioning species worthy of particular study is that those birds about whose displays we know most are often those which would repay further and more detailed study.

Corporate displays. In spite of their great interest many of these have not received the attention they deserve. Typical of the social displays which could be profitably investigated are the assemblies of the Blackbird (*Turdus merula*), the Magpie (*Pica pica*) and the Great Snipe (*Capella media*).

Pair-formation. Among subjects worthy of study are: How does one sex identify the other? Which sex is dominant, and when? (Dominance relationships may change at the beginning of reproductive activity in some species but may remain constant in others.) How is the pair-bond formed in species which remain in flocks almost up to the time of nesting? In what species does pair-formation occur in more than one way? What differences are there in display before the first brood and before the second? Does display obey a rhythm and reach peaks at certain times? In polygamous species how is the disadvantage of only one parent being available to tend the brood offset? Ringing techniques have now advanced so far that populations of individuals of known age can be studied. It has been shown that the behaviour of mature and experienced birds may differ in some respects from that of birds breeding for the first time. Studies of such populations would throw light on the important question of the relationship between innate and learned behaviour.

Soliciting. What calls and postures are used by the female to attract and stimulate the male, and in what circumstances?

Songs and calls. The modified forms of song associated with sexual display are of great interest but discussion of song is beyond the scope of this paper. It should be stressed, however, that songs and calls associated with display must be considered an integral part of the performance.

Greeting displays. These should be scrutinized from the point of view of their relationship to courtship posturing. There is doubt at present as to whether some displays may most appropriately be regarded as greeting or appeasement. The latter are those in which an aggressive element is evident while the term "greeting display" should be confined to posturing in which pugnacity is not apparent, or only to a very minor extent. Many mutual displays appear to be less appeasement than greeting or connubial activities. Here is an extensive field for study.

Courtship and connubial feeding and the presentation of material. The relationship of ceremonial feeding to normal feeding and the feeding of young, and of the presentation or mandibulation of nest-material to nest-building deserve study. There is evidence for some species that these may be ritualized displacement activities. Some displays appear to have evolved from feeding or nest-building movements. The tidying of their "courts" by lek birds and the construction of incomplete nests, "scrapes," roosting platforms and the like are of interest in this connection.

Mimetic displays. Mimetic, or socially facilitated behaviour occurs when the perception of the movements of an organism induces similar behaviour in another (Armstrong, 1951). Mimesis may occur between birds of different species but is most usual between those of like species and especially between individuals in close *rapport.* Threat and distraction displays may be induced mimetically, but the most striking performances in which mimesis appears to be involved are the mutual or reciprocal displays of paired birds. Analysis of such behaviour would throw light on the concept of "mood" or "tendency to react" in birds.

AGGRESSIVE OR APOSEMATIC DISPLAY

Threat displays appear to be derived mainly from the clash of attack (or defence) and escape motivations. Moynihan (1955b) divides the types into (a) Intimidatory or threat, (b) Mimetic, (c) Appeasement, and (d) Deceptive. The final group might be regarded as a sub-group of (c). As yet "deceptive" display is not well substantiated in birds. Appeasement or submissive displays are, of course, the opposite of aggressive so that they come into consideration with them because they appear in the context of aposematic display. The term "agonistic" has been used (Scott and Fredericson, 1951; Hinde, 1955-56) to include attacking, fleeing, threatening and submissive behaviour. It is a useful omnibus term and enables activities which share casual factors to be discussed together, but categories of behaviour have to be differentiated within it. The relevant displays are threat, appeasement and, if we regard distraction display as involving escape components, it might be classed as a form of display associated with fleeing, although it embodies other forms of agonistic motivation.

In the relationship of the sexes the balance between sexual and aggressive motivations varies from time to time and one or other may tend to be more prominent in some species than in others. Just as the territorial song of many birds is ambivalent, in the sense that the male tends to be repelled and the female attracted, so a form of posturing might have aggressive valence in regard to males and be sexually stimulating to females. Part of the fascination of the study of displays lies in the challenge presented to distinguish the relationship between threat and sexual elements and to note the subordination of threat components during pair-formation or before copulation.

Attention should be given to any differences observable between interspecific and intraspecific threat displays (including utterances) and in general, to the behaviour of birds to predators. Encounters of this kind are usually witnessed only by a lucky chance and professionals are too few for information on this topic to be accumulated rapidly by them alone.

Corporate fighting between flocks of Starlings (*Sturnus vulgaris*) has occasionally been recorded and is not understood. " Mobbing " also deserves further study. A subject for research might be the investigation of threat and attack behaviour of so accentuated a character that the bird becomes unaware, or regardless, of other potential sources of danger, as when a Nightingale (*Luscinia megarhynchos*) perches on a man in order to attack a stuffed Cuckoo (*Cuculus canorus*) (Smith and Hosking, 1955) or a fighting Wren (*Troglodytes troglodytes*) allows itself to be handled (Armstrong, 1955).

DIVERSIONARY OR PARATREPTIC BEHAVIOUR

Diversionary behaviour includes all types of activity, apart from actual attack which have the effect of deflecting the attention of an intruder from the nest, eggs or young to the adult (Armstrong, 1949). " Distraction display " is usually employed to describe injury-simulation and related performances during the breeding-cycle which appear to be due to defence-motivation conflicting with the impulse to flee. There are also displays, often embodying threat movements, in which the bird makes itself conspicuous and by its demonstrativeness may attract a predator's attention. In addition, transference or displacement activities, such as pecking movements made by an agitated bird walking near its nest, or brooding away from the nest may have a deflective function and need scrutiny with this possibility in mind. In distraction displays, especially of the more elaborate injury-simulation types, there seems to occur an amalgamation of movements derived from defence- and retreat-patterns. So few distraction displays have been carefully studied that there is wide scope for research particularly suitable for the attention of amateurs who live near the breeding ground of species which behave in this way. Intensive work can be—indeed, has to be—concentrated into a few weeks. Simple experiments would yield much valuable information. Cinematograph films should be made, where possible.

Among data which might be recorded are: (1) Waxing and waning of displays relative to phases of the breeding-cycle; (2) Sequence of behaviour-patterns involved; (3) Distance from nest and intruder of the displaying bird and any correlation observable between boldness and distraction behaviour; (4) Diversionary or threat behaviour to natural predators, ungulates and other intruders (objects or phenomena) than man; (5) Accentuation or diminution of display correlated with time, day or night; (6) "Out of context" activities such as down-plucking by ducks or pebble-casting by waders associated with disturbance at the nest. Among questions which might be asked are: (7) Which sex displays most and what is the behaviour of the displaying bird's mate? (8) May diversionary behaviour be induced merely by surprise, e.g. by a loud noise apart from other disturbance? (9) To what extent does the reaction show signs of exhaustion after repetition? (10) Do the calls uttered during such display resemble those characteristic of any other type of situation? (11) Does the display resemble the movements of another animal? (12) Are there environmental circumstances which might render the display particularly effective? (13) May it have evolved through the selective effect of any particular type of predator?

Attention should be paid to the less spectacular forms of these displays and to apparently related forms of behaviour, such as the wing-flipping of tits on the nest, the half-raising of a wing by brooding doves when closely approached and the impeded flight of many species.

Very little is known concerning the extent to which children and unsophisticated people are deceived by injury-feigning into trying to capture the displaying bird. Ornithologists visiting or residing among people of lower cultures have exceptional opportunities for making notes of interest on this subject.

Distraction display is appropriate for amateur research as it cannot be studied in captive birds; institutions possessing aviaries are at no advantage in this matter. Among topics worthy of attention would be the incidence of diversionary display among the ducks. A correlation of the displays in relation both to species and habitats would be valuable. Ornithologists visiting some areas of the arctic have excellent opportunities for observing these displays, as they are common and accentuated in high latitudes, but records from tropical rain-forest woud be particularly interesting as distraction performances are relatively rare in this type of habitat. There is evidence of a south-north cline in the accentuation of some distraction displays. The extent to which this obtains can best be determined by the accumulation of observations by amateur observers in many scattered areas.

GENERAL ASPECTS OF DISPLAY

Integrative study. When observing the displays of any species it is important to consider the performances in relation to the bird's other adaptations and the nature of the habitat. The relationship between the character of the display and the environment is often close. Thus, for example, just as the young of birds which nest on cliff ledges are adapted to their precarious cradles to the extent that they move about very little so the displays of the adults are adapted to performance on a very limited stage. In contrast, many birds of steppe and tundra indulge in wide-ranging aerial displays. Feeding adaptations often have a bearing on the character of displays; the posturings of the Avocet (*Recurvirostra avosetta*) are such as not to jeopardize the delicate bill whereas the powerful beaks of Gannets (*Sula bassana*) are clashed together in the mutual display.

Adornments. Observations should be directed to ascertaining the particular displays, or their phases, in which specific structures and adornments are used. Adornments associated with appeasement may be situated at the back of the head or neck, and in injury-simulation markings on the tail may be significant. In aerial display the coloration of the belly may be a sign-stimulus in relation to the female.

SPECIES OF SPECIAL INTEREST

It is with great diffidence that a list is appended of species worthy of special study for any such list must seem arbitrary. It should be regarded as merely one person's views concerning gaps in our knowledge and his ideas on what is of importance in this sphere, taking into account work which has been done and studies of particular groups or species which the writer happens to know have been completed or are in progress. For instance, the buntings, finches, gulls, ducks and geese are not mentioned because of the research which is already being carried out on them. Readers might have preferred an annotated list specifying in which species the sexual, threat or diversionary displays required particular study, but to attempt such precision would be misleading. For reasons which will be apparent to the reader, concentration on the sexual display of a species without scrutinizing also its threat postures would be misguided. Diversionary displays have received so little attention that there is hardly a species which would not repay close study. No reader should assume that because a bird is unmentioned below there is not much of great interest yet to be recorded concerning its displays. The list follows the order of *The Handbook*.

Magpie, Nutcracker, Golden Oriole, Snow Finch, Tree Sparrow, some larks and pipits, Grey Wagtail, Treecreeper, Wallcreeper, Nuthatch, Crested Tit, Long-tailed Tit, the shrikes, Waxwing, Goldcrest, Firecrest, some warblers (especially S. European species), Mistle Thrush, Redwing, Fieldfare, Blackbird, Ring Ouzel, Rock Thrush, the chats, Black Redstart, Thrush Nightingale, Bluethroat, Alpine Accentor, Roller, the woodpeckers, Wryneck, Great Spotted Cuckoo, Snowy Owl and some other owls, Gyr Falcon, Lesser Kestrel, Red-footed Falcon, Rough-legged Buzzard, Kite, White-tailed Eagle, Griffon and Egyptian Vultures, Spoonbill, Purple Heron, Great White Heron, Little Egret, Cattle Egret, Bittern, Gannet, Leach's Petrel, Red-necked Grebe, Great Northern Diver, Black-throated Diver, Pallas's Sand Grouse, Bar-tailed Godwit, Whimbrel, Slender-billed Curlew, Great Snipe, Grey Phalarope, Knot, Curlew Sandpiper, Broad-billed Sandpiper, Greater Yellowlegs, Spotted Redshank, Marsh Sandpiper, Grey-rumped Sandpiper, Caspian Plover, Pratincole, Stone Curlew, the bustards, some terns (especially Little), Pomarine Skua, Long-tailed Skua, Black Guillemot, Little Auk, Little Crake, Water Rail, Coot, Red-legged Partridge, Quail.

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BEGGING RESPONSES OF CERTAIN BUNTINGS

By R. J. Andrew

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This paper, which is one of a series of studies of the behaviour of buntings (see references), describes the changes in the begging responses of young Reed and Corn Buntings and Yellowhammers (*Emberiza schoeniclus, E. calandra* and *E. citrinella*), as they increase in age. Such changes have not previously been described in detail for any Passerine. They are largely caused by the appearance of adult feeding, aggressive and fear responses. Five Reed Buntings and three Corn Buntings were hand-reared from the age of nine days, whilst Yellowhammers were observed in the nest from three days of age, and Reed Buntings on the first and second day.

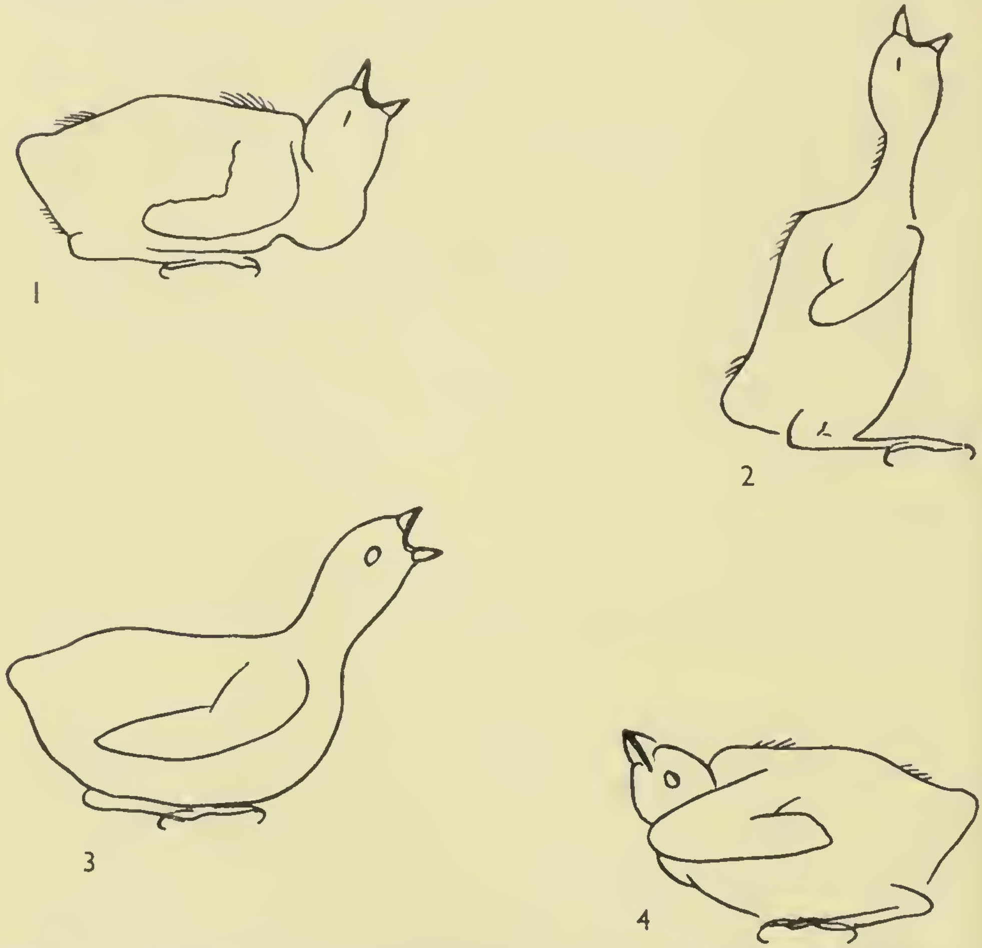
The term "tendency" is used objectively (Hinde, 1955-56): an animal is said to have a tendency to give a response, when the observer can deduce from his previous experience and from the animal's present behaviour that it is likely to give the response. Much of an animal's behaviour may be divided into groups of responses which tend to occur together (e.g. the fear responses of fleeing, hiding, freezing and giving certain calls). Here such a group of responses are all said to "express" the same tendency (e.g. above, the tendency to give fear responses; termed, for brevity, "fear").

I would like to thank Dr. R. A. Hinde for his help in the preparation of this paper, and the staff of Madingley Ornithological Field Station for making possible the hand-rearing of these birds.

(A) BEGGING WITHOUT FEAR OR AGGRESSIVE COMPONENTS

(a) *Movements of body and head.* On the first and second days of life, Reed Buntings gaped vertically with fully extended necks. The head tended to droop and was repeatedly returned to the vertical. The gape was not pointed at food, since the birds responded only to auditory and tactile stimuli (cf. *Turdus* spp., Tinbergen and Kuenen, 1939). At 7 or 8 days they still gaped vertically to non-optical stimuli. They raised the head (Fig. 1), or the head and body (Fig. 2) towards the vertical, and then repeatedly raised both slightly further ("push-ups"). The gape was turned towards food but the body remained erect. On later days the push-ups became more obvious and were accompanied by leg extension; they were given even though they brought the birds no closer to laterally presented food. Each was preceded by a lowering of the head and body and was thus identical with an incomplete upward leap. Probably they represent take-off movements.

In the early begging of the Yellowhammers, the body was erect and the gape directed vertically, as in the Reed Bunting. Slight push-ups of the head and body sometimes occurred, and may have developed into the repeated crouches followed by incomplete upward leaps which were sometimes given before begging on about the 15th day. Slight push-ups were often replaced by a movement (perhaps a variant) in which the head was nodded backwards and forwards in the sagittal plane, as well as being moved up and down vertically (Fig. 3). The gape was turned towards the food by the 5th or 6th day, and after this the erect stance usual in early begging was progressively abandoned in begging to laterally presented food.



FIGS: 1—Begging, low intensity (Reed Bunting, *Emberiza schoeniclus*, 7 days). 2—Begging, high intensity (Reed Bunting, 7 days). 3—Begging with nodding movements (Corn Bunting, *E. calandra*, 10 days), 4— Withdrawal response (Corn Bunting, 7 days).

The Corn Buntings' behaviour from the 7th day onwards was very similar to that of the Yellowhammers.

(b) *Wing-vibration.* The wing-vibration of begging, like that of courtship or toilet behaviour (Andrew, in press c and a), involved both extension and elevation movements. In the Reed Buntings it appeared about the sixth day. It was very variable in form, involving sometimes large amplitude wing-beats and sometimes wing-quivering, and was sometimes absent from the most intense begging. The Corn Buntings first vibrated their wings on the

15th day. Thereafter wing-vibration was common and often marked. It showed the same variations as that of the Reed Buntings, except that often one of the wings would move less vigorously than the other or remain still. Wing-vibration appeared on the 12th day in the Yellowhammers and was usually of low intensity, being absent from many intense beggings. Occasionally the wings were raised without any vibration or extension, on the days before vibration had appeared.

(c) *Close begging calls* (Andrew, in press b). These were first clearly heard in the Reed Buntings on the 8th day, and by the 18th day had almost disappeared from begging. A variant which persisted longer and first appeared about the 11th day, was the "worrying call". This was a liquid "skwu—skwu—" which was given as the food was swallowed, and seemed to represent the begging call rapidly repeated and modified by the mouth being full of food. In the Corn Buntings and Yellowhammers, the close begging call persisted longer than in the Reed Buntings.

(d) *Locomotory responses and the distant begging call.* After about 10 days of age, the Reed Buntings moved about when hungry, and gave the distant begging call "tip," which probably expresses a tendency to move (or fly) (Andrew, in press b). They would approach a distant source of food but always became motionless when begging, although they often gave "tip" calls and "push-ups". There were no indications of fear; probably they were motionless because of an inhibition of locomotion such as prevents nestlings from leaving the nest before about 10 days of age, although they are capable of moving rapidly if disturbed. At about 15 days they showed fear of the food and thereafter they sometimes approached or retreated whilst begging. The Yellowhammers showed the same change at about the same age.

(e) *Summary.* All the components of begging so far described express hunger. Some of them (the distant begging calls and the push-up movements) probably express a tendency to approach the food to feed.

(B) THE DEVELOPMENT OF ADULT FEEDING RESPONSES

Even on the 9th day the Reed Buntings occasionally pecked at food when they were not very hungry; they also pecked at markings on the walls. Both these responses seemed to express curiosity rather than hunger, for when the birds were hungry they always gaped and begged: they even begged at food that fell on the ground, instead of pecking it up. All of them were pecking up and eating food by the 20th day, and by the 30th day, although they sometimes begged at the spatula on which their food was placed, they no longer grasped the food with the gape but instead pecked it off.

(C) THE DEVELOPMENT OF FEAR RESPONSES

(a) *General.* The first fear responses of the Reed Buntings were given at about 9 days of age and consisted of high "eee" calls

(Andrew, in press b), given when a feather was accidentally twitched by the observer. On the 12th day the approach of an extended forefinger produced sudden crouches with feather-sleeking (intention movements of take-off) followed by crest-raising; on later days the birds sometimes fled. On the 20th day freezing was given to an outside disturbance. Cooling responses (e.g. gaping) appeared during fear (Andrew, 1956) on about the 30th day. About the 40th day one bird gave them very persistently without any obvious external cause, sometimes also raising the crest.

Yellowhammers sometimes gave "eee" calls as they struggled in the hand at 8 days. If released, they usually attempted to flee. The Corn Buntings showed similar behaviour at 10 days, and from the 14th day onwards fled from a presented finger much more persistently than the other two species. The fledglings thus resemble adult Corn Buntings in the easy arousal of fear responses (Andrew, in press d).

(b) *Fear responses in begging.* When (about the 15th day) the Reed Buntings began to show fear by backing away during begging, they also began occasionally to give calls like "eee" fear calls instead of the close begging call. Thereafter, the crest was often raised in begging, and begging was sometimes preceded or followed by intention-of-flight crouches.

(D) THE DEVELOPMENT OF AGGRESSIVE RESPONSES

(a) *The change in form of begging to resemble the head forward threat posture.* In the Reed Bunting, begging already shared three components with a head forward posture (Andrew, in press c) on about the 7th day: gaping, neck extension and turning the bill towards an optical stimulus. On about the 15th day, the body was sometimes held horizontal during an otherwise intense begging. Possibly the tendency for the gape to be moved towards the laterally presented spatula was beginning to cause the component of body raising to be abandoned. By the 18th day the body was usually horizontal, and often only the head was raised even if the food was presented from above. Sometimes the head was held in line with the body as in a head forward posture. Wing vibration and the close begging call were still present.

On about the 25th day apparently aggressive components appeared in begging to the spatula. Calls similar to the "chaa" and "chee" threat calls were given, sometimes together with a wild rush at the spatula. On later days wing-vibration became rare and the begging call was usually absent; the legs were only slightly flexed and the posture was almost identical with that of a head-forward threat.

Similar changes occurred in the Yellowhammers.

(b) *Head-forward posture given to other birds.* The Reed Buntings gave these first on about the 35th day, when the modified begging postures described above were still being given to the spatula. The first threats were gapes, often with "chaa" calls, and were given when a fellow pecked in curiosity at the head or bill; about a day later full head-forward postures were seen.

(c) *Relation between begging and the head-forward posture.* The close resemblance between the final modified begging posture, and the head-forward posture may be partly due to accidental convergence. However, it is probably chiefly caused by a tendency to behave aggressively during begging, altering the form of the begging posture towards that of a head-forward posture. Andrew (1956, and in press b and c) describes cases where an animal with tendencies to give two different responses, gives behaviour which resembles both responses, and terms this "compromise behaviour." This is best exemplified here by the gape which is a component of both begging and the head-forward posture. Certain other components of the modified begging posture (e.g. aggressive calls) may be solely aggressive.

The modified begging posture is interesting in showing the danger of deducing the course of evolution of a display from its apparent course of development in young animals. It is very unlikely (Andrew, in press c) that threat postures have evolved from begging postures.

(E) THE WITHDRAWAL RESPONSE

This was given by young Buntings when roughly handled, and probably served to protect them when other nestlings trampled on them. The head was withdrawn and pulled down to lie in front of the body, whilst the wings were raised and moved a little forward so that they protected the head (Fig. 4). Occasionally begging responses were also given: e.g. the bill might be tilted upwards and slightly opened.

SUMMARY

The begging of the Yellowhammer, Reed and Corn Buntings, and the development of fear responses are described. Reed Bunting begging comes to resemble an adult head-forward threat-posture more and more with increasing age; reasons for this are suggested.

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FLUCTUATIONS IN PARTRIDGE POPULATIONS

By Colin Matheson (*National Museum of Wales*)

A previous paper (Matheson, 1953) included a brief note on the appearance of more or less regular cycles of increase and decrease in bags of Partridges (*Perdix perdix*) in various areas of England and Wales. Reference was made also to the remarkably regular fluctuations of this kind in the Hudson's Bay Company records of some northern animals, the peaks in numbers for one or several species often synchronizing over large areas to an extent that suggested some widespread climatic or meteorological factor as the cause. In current text-books like that of Odum (1953), it is usual to regard the population cycle in certain animals as a fact for which the explanation is still unknown.

On the other hand, some workers now hold views summarized in the words of Cole (1954), that "until definite evidence to the contrary is forthcoming, the preferred interpretation of population cycles should be that they are essentially random fluctuations". Errington (1954), however, while agreeing with much of Cole's argument, submits evidence of "synchronies in population symptoms" among different animals over wide areas; and does not see what these could reflect except "something affecting life processes of many species on at least a regional scale".

Apart from the question as to the objective reality of cycles, there is the danger that gamebag records may not always constitute reliable samples of the population concerned (Mackenzie, 1952; Middleton, 1934; Moran, 1952). Nevertheless, such records are likely to remain for a considerable time among the few long-term series of data available, and it seems desirable that they should be published whenever possible. As Cole observes, "The studies involving careful census techniques will not be of adequate length for some time to come".

Since my previous paper appeared there have come to my notice, through the courtesy of Mrs. D. Dilwyn John, some records quoted by Viscount Templewood in his book *The Unbroken Thread* (1949). These were taken from the game-book kept by his grandfather, John Gurney Hoare, for the family beats near Cromer for the period 1847 to 1873, the last year in which he was shooting. At this period, Lord Templewood states, there were never more than two or three guns on any Partridge day, usually only two. The shooting was conducted for the most part on much the same lines as had obtained from 1811 to 1847; but from 1867 onwards most of the Partridges were driven, and this is stated to account for the large increase in the bags in the late 60's. The table below is taken from the book, with the addition of the records for the 1854-55 season which were kindly supplied to me by Lord Templewood later.

TABLE I—TOTAL BAGS OF PARTRIDGES (*Perdix perdix*) ON HOARE ESTATE IN NORFOLK, 1847-73

Season	*Partridges*	*Season*	*Partridges*
1847-48	1,077	1860-61	98
1848-49	1,557	1861-62	637
1849-50	1,312	1862-63	461
1850-51	1,386	1863-64	622
1851-52	934	1864-65	887
1852-53	870	1865-66	1,533
1853-54	894	1866-67	1,367
1854-55	158	1867-68	1,704
1855-56	688	1868-69	1,539
1856-57	1,001	1869-70	2,160
1857-58	1,210	1870-71	1,654
1858-59	1,411	1871-72	1,096
1859-60	1,519	1872-73	818

A second set of game-records is calculated from the gamebooks of the Gogerddan estate in Cardiganshire, which are now in the possession of the National Library of Wales at Aberystwyth.*

They cover the period 1804-05 to 1868-69, though the entries for various seasons up to 1831-32 are missing. From 1832-33 onwards, however, there is a continuous run of records (Table II).

TABLE II—TOTAL BAGS OF PARTRIDGES (*Perdix perdix*) ON GOGERDDAN ESTATE IN CARDIGANSHIRE, 1832-69

Season	*Partridges*	*Season*	*Partridges*
1832-33	164	1850-51	347
1833-34	267	1851-52	284
1834-35	27	1852-53	314
1835-36	170	1853-54	258
1836-37	166	1854-55	192
1837-38	152	1855-56	215
1838-39	92	1856-57	411
1839-40	60	1857-58	467
1840-41	37	1858-59	632
1841-42	52	1859-60	635
1842-43	90	1860-61	237
1843-44	140	1861-62	299
1844-45	296	1862-63	159
1845-46	311	1863-64	145
1846-47	261	1864-65	227
1847-48	300	1865-66	584
1848-49	238	1866-67	496
1849-50	333	1867-68	721
		1868-69	620

Without placing too much weight on comparatively short runs of data, it may be of interest to compare the trends for the Cromer and the Gogerddan figures during the period common to both of them—that is from 1847 to 1868. The Cromer figures show a marked peak (1,557 partridges) in 1848, followed by a fairly regular decrease to a minimum of 158 in 1854, and then an uninterrupted increase up to 1,519 in 1859. Thereafter there is a sudden crash in numbers, and for the next five seasons the bag never reaches 900; but from 1865 onwards there is a run of very good seasons culminating in a bag of 2,160 partridges in 1869; after which there is again a marked decline. At Gogerddan, the bags for 1849 and 1850 (333 and 347) are the highest recorded up to that time, and are followed by smaller bags reaching a minimum of 192 in 1854, and thereafter by regularly increasing bags up to a maximum of 635 in 1859. Then follows a fairly regular decrease to 145 in 1863; and from 1864 onwards a definite though (as in the Cromer figures) rather irregular upward trend until the records finish in 1868. It seems relevant to point out that similar trends and synchronies appear in the Denbighshire records discussed in my former paper (*loc. cit.*), where the figures rise regularly, from their commencement in 1854, up to 466 in 1857 (1859 being slightly behind with 407). Thereafter all the figures are well below 300 (with a minimum of 105 in 1864) until they rise to 651 in 1868 and to 710 in 1869. The data given by Middleton (1934) for another Norfolk estate show a very similar pattern. Our figures, therefore, so far as they go, seem consistent with Middleton's suggestion of "a definite correlation between the peak periods on different estates".

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* My thanks are due to Dr. Thomas Parry, Librarian of the National Library, for lending these books to the National Museum of Wales.

The object of this note, however, is to stimulate any naturalists who are aware of game-records covering a long period, to publish such records if possible. The more data that become available for comparison, the greater will be the opportunity of judging whether any features in them are of biological significance or are to be regarded mainly as random.

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THE INTERPRETATION OF VARIATION AMONG THE YELLOW WAGTAILS

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There is perhaps no other group of Palaearctic birds the variation of which is as puzzling as that of the Yellow Wagtail (*Motacilla flava*) complex. In a recent contribution Williamson (1955) has examined the effect of migration on this phenomenon and has come to conclusions which in part are in conflict with previously expressed views. His provocative treatment has stimulated the following discussion.

The two phenomena which have been particularly puzzling are the checkerboard type of distribution in this complex and the exceedingly high and somewhat irregular variability in many populations. The checkerboard type of distribution is characterized by the fact that very similar populations occur in far distant places: such as yellow-headed forms in England (*flavissima*), in the west Asiatic steppes (*lutea*) and in eastern Siberia (*taivana*); or virtually indistinguishable grey-headed forms in western Europe (*flava*) and easternmost Siberia (*simillima*); while exceedingly different populations, such as *flava-thunbergi* or *flava-feldegg,* approach each other very closely. The simple-minded solution is not to worry about the historical events that have led to this pattern of distribution nor about the reproductive relation of these populations, but to consider them like so many coloured pebbles and to sort them out into species on the basis of similarity. It hardly needs to be mentioned that the pebble-sorting approach is not very satisfying to the biologically-minded ornithologist of today. What then is the biological significance and the history of this curious distribution? We shall take up these questions presently.

The other phenomenon is the exceedingly high variability found in many populations of Yellow Wagtails. It had been suggested in the past that this species is particularly unstable genetically and that it has a tendency to produce similar " mutants " throughout its range. Williamson cites much evidence serving to restrict, if not negate entirely, the validity of this theory. The variability is not equal in all populations of the species but zones of high variability happen to coincide with zones of secondary intergradation where sharply differentiated populations have come into secondary contact and now interbreed. Other populations of the species, particularly such peripheral populations as the Egyptian *pygmaea* or the far eastern *tschutschensis,* are no more variable than an average population of birds. It seems to me that, true as this may be, it overlooks the point that the Yellow Wagtails do have an unusually high potential for variability. In what other single species do we find grey-headed, black-headed, yellow-headed, and white-headed types, not to mention the variability in the superciliary, the ear-coverts, the chin, etc.? If different races of this species-complex can differ in these characters, as a result of a potential for such variation, why should it not express itself also in a potential for individual variation? I believe the truth is somewhere between Williamson's assumption that we deal with a limited number of " pure types " and that variation is due to hybridization and migratory pollution, and the Stresemann-Grote view of an exceptionally high potential of individual variability.

A study of the literature on the subject reveals the distressing fact that most conclusions on the geographic variation and distribution of Yellow Wagtails are based on the pebble-sorting technique, very often indeed of specimens collected on migration or in the winter-quarters. This is a dangerous approach even in a species with a simple pattern of variation but quite fatal in such a difficult species-complex as is *Motacilla flava*. In such a species an analysis of breeding populations only can lead to meaningful results and there are, unfortunately, only few such analyses. When it comes to determining the individual variability and the area of distribution, as well as the validity, of the forms indicated by the names *plexa, zaissanensis, angarensis, macronyx,* and *simillima,* an analysis of migrants in western museums is virtually valueless. It is therefore useless to speculate how many of these names represent recognizable forms. More important are a number of biological questions which can be phrased as follows:

A. Are the three forms of yellow-headed Yellow Wagtails (*flavissima, lutea,* and *taivana*) more closely related to each other than any of them are to grey-headed or black-headed populations?

B. Are the three forms of yellow-headed Yellow Wagtails a different species (*M. lutea*) from the dark-headed populations (*M. flava*)?

C. What is the historical or ecological reason for the peculiar distribution of the various forms in the *Motacilla flava* complex?

A close relationship of the three forms of yellow-headed birds is rather generally assumed. Indeed some specimens of Asiatic *lutea* are hardly distinguishable from *flavissima*. Yet the distribution of this " group " is very unnatural, and I know of no other species of animal or plant of which one subspecies occurs in Great Britain, a second one in the steppes of western Asia between the lower Volga and the head waters of the Yenesei, and a third one in eastern Siberia from the upper Lena River east to the Sea of Okhotsk. Furthermore, the entire *flava* complex is replete with deceptively similar but obviously unrelated populations, such as European *flava* and east Siberian *simillima*. Similarity alone is sufficient for pebble-sorting, but may not lead to a true understanding of the situation.

Williamson has been bothered by this bizarre distribution-pattern and has attempted a new interpretation. This, to me, is the least convincing part of his paper. He suggests that the prevailing winds might carry *flavissima* on its spring migration into the migratory range of *lutea* (Nile Valley) and that this " could result in their continuing migration together." This suggestion is based on the assumption that the birds would migrate together because they are similar. There is no evidence for this. On the contrary, there is much evidence for joint migration of exceedingly dissimilar races. Since dissimilarity in this group does not even necessarily interfere with pair formation (a much more sensitive process than joint migration), it is unlikely that any *flavissima* individuals will be induced to follow *lutea* all the way to their summer home in the Kirghiz Steppes. If there were a steady loss of *flavissima* to these west Asiatic populations it would surely lead to an eventual depletion of the British population. Furthermore, if *flavissima* joins flocks of *beema* and *lutea* why does it not join also flocks of other races of *flava* which migrate through the Nile Valley? The range of *lutea* is north-east of the Nile Valley, that of *flavissima* north-west of the African winter-quarters. All we have recently learned about orientation in birds makes it very clear that such a drastic mistake as migrating to the north-east instead of north-west would not be made by anything except a minimal fraction of a population. In sum, I doubt that any migration phenomenon can be called upon to explain the similarity of *lutea* and *flavissima*. This leaves just two other interpretations, namely that we have here relic populations of a formerly widespread species or that the similarity is purely fortuitous and that the similar phenotypes are the accidental by-products of adapting local populations by selection, in one case to the environment of Great Britain and in the other case to that of the west Siberian steppes. One cannot choose between these two alternatives until a different question is answered.

Are the yellow-headed populations specifically different from the grey-headed populations? This, unfortunately, is a question that cannot be decided in the museum but must be decided in the field. The weight of the recent evidence seems to favour specific distinctness, although some of the claims are based on the arbitrary segregation of museum specimens. I am not aware of a quantitative analysis of even a single breeding population of *lutea*. What are the ecological differences between grey-headed and yellow-headed birds and how many mixed pairs occur in zones of overlap? The field-ornithologist will have the last word. Even in England and western France where *flava* and *flavissima* are reported to behave as if reproductively isolated, we have not a single good study dealing with the nature of this isolation. Do the two forms prefer different habitats? Do they arrive at different dates in the spring and are they therefore out of step physiologically? Do the *M. f. flava* immigrants arrive as solid flocks and then colonize a breeding area as a flock so that they are inclined to form pairs only with other individuals of this flock? There are enough reports to show that the reproductive isolation is not complete. What I wonder is whether it exists at all? There is little use to do more speculating on the basis of museum specimens until a lot more solid field-work has been done.*

In any interpretation we must strenuously avoid two tendencies which in the past have often misled the taxonomist. The first one is to think and explain matters in terms of individuals, " museum specimens," instead of in terms of natural populations. The second tendency is to consider possible interpretations as mutually exclusive. For instance, if pale grey-headed *beema*-like individuals turn up in south-eastern England must one interpret these individuals all identically as being either *beema*-like variants in a *flava-flavissima* population or as displaced migrants of *beema*? Could not some be one, and some the other? Or worse, if we should decide that all these individuals are definitely displaced *beema* would this permit us to conclude that all aberrant individuals in all populations are displaced migrants from elsewhere? Surely not!

With all these questions and doubts it might seem as if the taxonomy and the biogeographic history of the *Motacilla flava* complex were a complete mystery. This is by no means the case. It is now quite clearly established that the Yellow Wagtail must have gone through a period during which the species was compressed into many relic areas consisting of widely separated populations. During this period the striking differences evolved which now characterize the populations of the species. How long ago this period was, whether during the height of glaciation or during a drought period in the late Pliocene, or during an arid period in one of the inter-glacials is yet to be determined. This much is certain, however, that complete reproductive isolation was not acquired during this isolation, although perhaps partial reproductive isolation between some of the yellow-headed populations and some of the others. Much in the pattern of variation indicates that there is some reproductive isolation also between some of the black-headed and grey-headed forms. In other areas there was so little incipient isolation that it broke down quickly on contact and led to zones of secondary intergradation, characterized by high variability. The basic pattern is clear, but much of the detail will have to be filled in through the study of breeding populations. The analysis of museum specimens, taken on migration and in the winter-quarters, is not likely to add much to what we already know.

---

*We would like to draw special attention to the questions that Dr. Mayr has framed in this paragraph. The opportunities for co-operation between field-ornithologists and taxonomists are particularly clearly shown here and we hope that this sobering discussion will stimulate work along these lines. If Anglo-Soviet co-operation in field ornithology develops favourably this would be an ideal subject for joint study.—EDS.

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NOTES

A useful field-character of the Icterine Warbler. — Icterine Warblers (*Hippolais icterina*) were watched at Fair Isle, and identification confirmed by trapping and examination of the wing-formula, on 30th May and 9th September 1954. The purpose of this note is to draw attention to a useful distinguishing characteristic which is not mentioned under the heading "Field-characters" in *The Handbook* (vol. II, pp. 61-62) or other recent bird-identification guides.

The spring specimen was bright greenish-olive above and exceedingly yellow beneath, and perhaps likely to be confused with a Wood Warbler (*Phylloscopus sibilatrix*) on a poor view. The autumn example trapped on 9th September, and an apparently identical bird watched for some time at close quarters on 7th and 8th, were much duller above and only very pale yellowish beneath: in indifferent light they could easily have been confused with a Garden Warbler (*Sylvia borin*). The best field-mark at both seasons was afforded by a light patch in the closed wing, pale golden-yellow in the spring bird and off-white in the autumn examples, which made a sharp contrast with the dark brown flight-feathers. This patch is caused by the overlapping pale fringes of the secondaries, and creates a wing-pattern which at once precludes confusion with any *Sylvia* or *Phylloscopus* species. Although this character does not appear to have been recorded, I may point out that the pale wing-patch is clearly visible in the excellent photographs of the Icterine Warbler taken by Eric Hosking and Ian M. Thomson and published *antea,* vol. xlvii, plates 21 and 25.

An important point is whether or not this pale area in mid-wing will serve to separate the Icterine from the Melodious Warbler (*Hippolais polyglotta*), since *The Handbook* and other authorities regard the two as virtually indistinguishable. The coloured plates by G. J. Keulemans in H. E. Dresser's *Birds of Europe* (vol. II, plates 80 and 81) depict this feature quite clearly in the Icterine, but show a uniformly brown wing in the Melodious. Skins I have examined suggest that the fringes of the secondary feathers are at best somewhat obscure in the Melodious, and in fact one with a prominent wing-patch labelled *H. polyglotta* proved to be *icterina* when I checked the wing-formula. The only Melodious Warbler I have examined in life was trapped at Fair Isle on 16th September 1955 (see pp. 94-96), and all who saw it in the field agreed that there was no suggestion of a wing-patch in this bird.

I have had correspondence with other bird observatory personnel on this problem, and their experience supports my own in so far as the Melodious Warbler is concerned, though some of the observations on the Icterine are indefinite. Roy Thearle (Bardsey Island) says no light wing-patch was seen in Melodious Warblers trapped in autumn 1954 and 1955, though field-observation of these birds was not possible; and R. F. Ruttledge (Great Saltee) informs me that no relevant observation is to be found in the laboratory records for a Melodious trapped in 1954 and two Icterines captured on 24th August 1955. He himself watched the Melodious Warbler closely in the field, but has no note or recollection of a pale wing-patch.

John Ash (Portland Bill) writes: "The last Icterine I saw was a migrant in September in Sweden several years ago. In my notes on this bird there is one passage which may be relevant: '. . . a fairly conspicuous pale patch on each closed wing is apparently formed by the pale margins to the primaries and secondaries: is this a good field-character? So far as the Melodious is concerned, I examined a bird trapped at Portland on 4th September 1954, but did not see it in the field. In the laboratory description there is no mention of any pale edgings to primaries or secondaries. A *Hippolais* warbler watched at the same place in the field on 19th September 1954 by myself and many others was probably *polyglotta* too. In the somewhat detailed description of this bird there is no mention of pale edgings to wing-feathers".

Thus, on the evidence at present available, it would appear that the pale wing-patch in the Icterine Warbler may well be diagnostic, and a safe field distinction between this and the closely-allied Melodious Warbler. It would be of great value if final proof of this could be obtained, and it is hoped that other observers—and particularly those who are engaged in bird observatory work— will follow up this note by giving the matter their close attention.

KENNETH WILLIAMSON

30 APR 1956
PURCHASED

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APRIL 1956

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Vol. XLIX
No. 4

APRIL
1956

BRITISH BIRDS

MIGRATION OF LITTLE STINTS, CURLEW SANDPIPERS AND RUFFS THROUGH GREAT BRITAIN IN THE AUTUMN OF 1953

By I. C. T. Nisbet and A. E. Vine

INTRODUCTION

During the autumn of 1953 a large passage migration of Little Stints (*Calidris minuta*), Curlew Sandpipers (*C. testacea*) and Ruffs (*Philomachus pugnax*) occurred in Great Britain, the numbers at some localities being described as exceptional. In response to the appeal made in this journal (*antea,* vol. xlvi, pp. 457-458) a considerable number of records of these species were sent to the authors, and are summarized and analysed in this paper. We are very grateful to all the observers (listed in the Appendix) who have contributed records, and also to Mr. J. E. Sluiters who has sent very valuable information from the Continent of Europe.

It is a well-known fact that the numbers of certain Continental-breeding waders which occur in Britain solely on migration vary considerably from year to year, and a summary of records of Little Stints and Curlew Sandpipers in 1946, the last "good" year, was published by Gibb and Tucker (1947), providing a useful comparison with the 1953 records of these species. In the case of the Ruff, published records suggest that numbers are steadily increasing in Britain as a whole (this certainly being true for the more favourable localities in S.E. and N.W. England which have been watched regularly for a number of years). It may be hoped that information on the causes of such fluctuations and long-term increases may be obtained by examination of the meteorological factors influencing migration at the times of the large arrivals, and this course is followed here. As, however, these causes are evidently complex, firm conclusions cannot be expected from a consideration of one season's records alone. Frequent reference will be made, therefore, to an analysis by one of the authors (Nisbet, 1956) of an exceptional migration of Wood Sandpipers (*Tringa glareola*) in Britain in autumn 1952, the only previous *detailed* work of this kind that we have been able to trace.

It is of interest that except at a few isolated places the numbers of birds were not exceptionally large, and that in some places larger numbers occurred in 1954. The numbers of all three species in the Wash basin in 1954, for example, were larger than any reported anywhere in the country in 1953 (*Cambridge Bird Club Report,* 1954). This analysis therefore refers to a prolific, but not exceptional, year.

Unlike the 1952 records of Wood Sandpipers, it is impossible to consider the whole migration in great detail, for the following reasons:

(i) owing to the great number of records, many of the notes received were merely summaries of observations over a considerable period, and it has not proved possible to obtain details of these observations, nor to obtain records from a number of suitable sites: daily or near-daily counts were received from only 10 particularly favoured places;

(ii) because of the unspecialized habitat preferences of the three species (the Ruff occurring on many small pools and even fields inland, and the other species halting in coastal creeks and parts of the open shore little visited by ornithologists) the records cannot form a good or even large sample of the migration;

(iii) the general pattern of migration was much more complex than that of the Wood Sandpipers (see below);

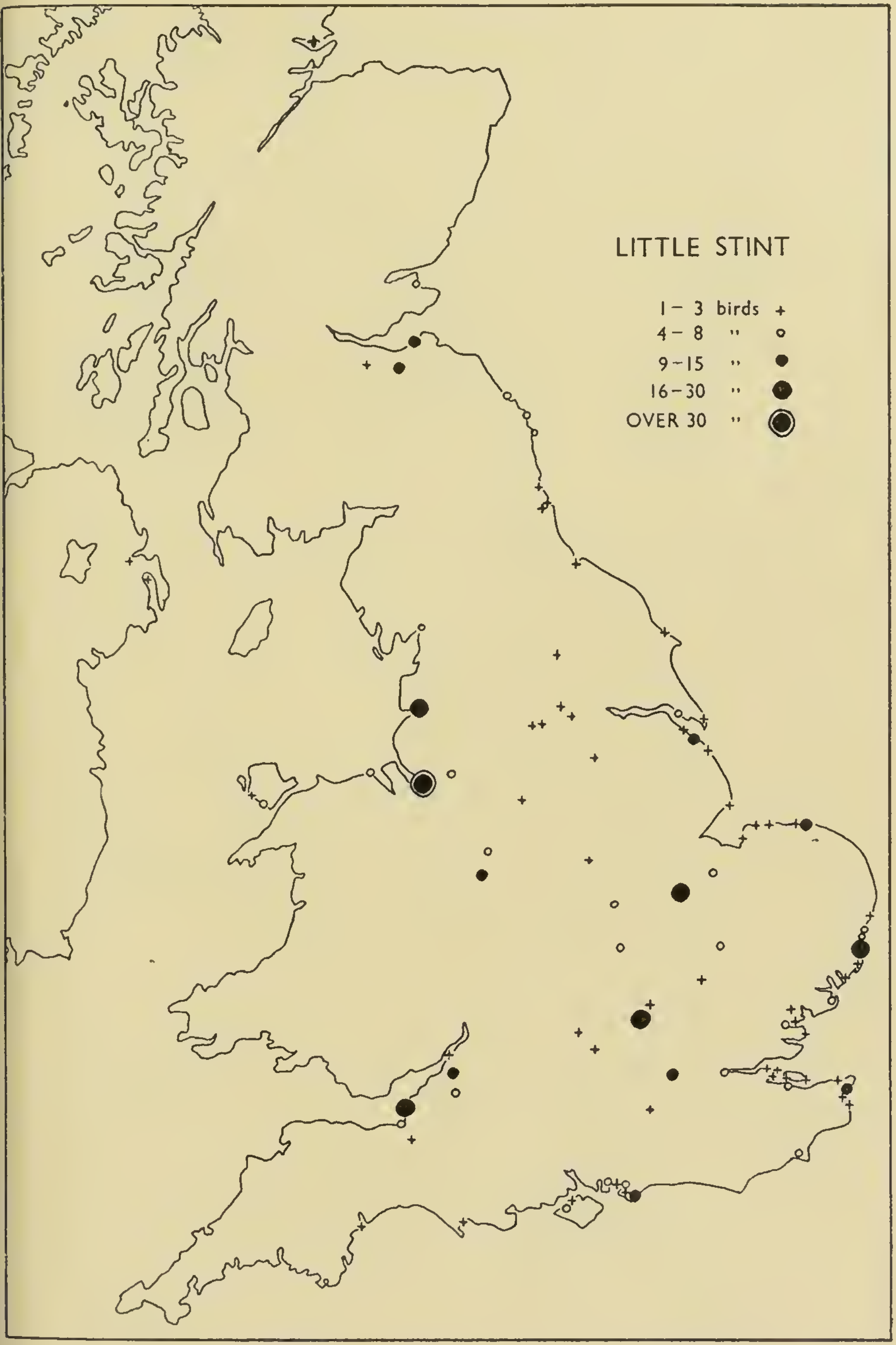
(iv) perhaps because of the lateness in the autumn of the main passage, the records do show a definite bias towards week-end observations: since the peak periods of arrival were undoubtedly at week-ends this bias presents a considerable obstacle to the detailed analysis.

For this reason only certain well-documented aspects of the migration will be discussed here in detail, with emphasis on comparison with the 1952 migration of Wood Sandpipers.

SUMMARY OF RECORDS RECEIVED

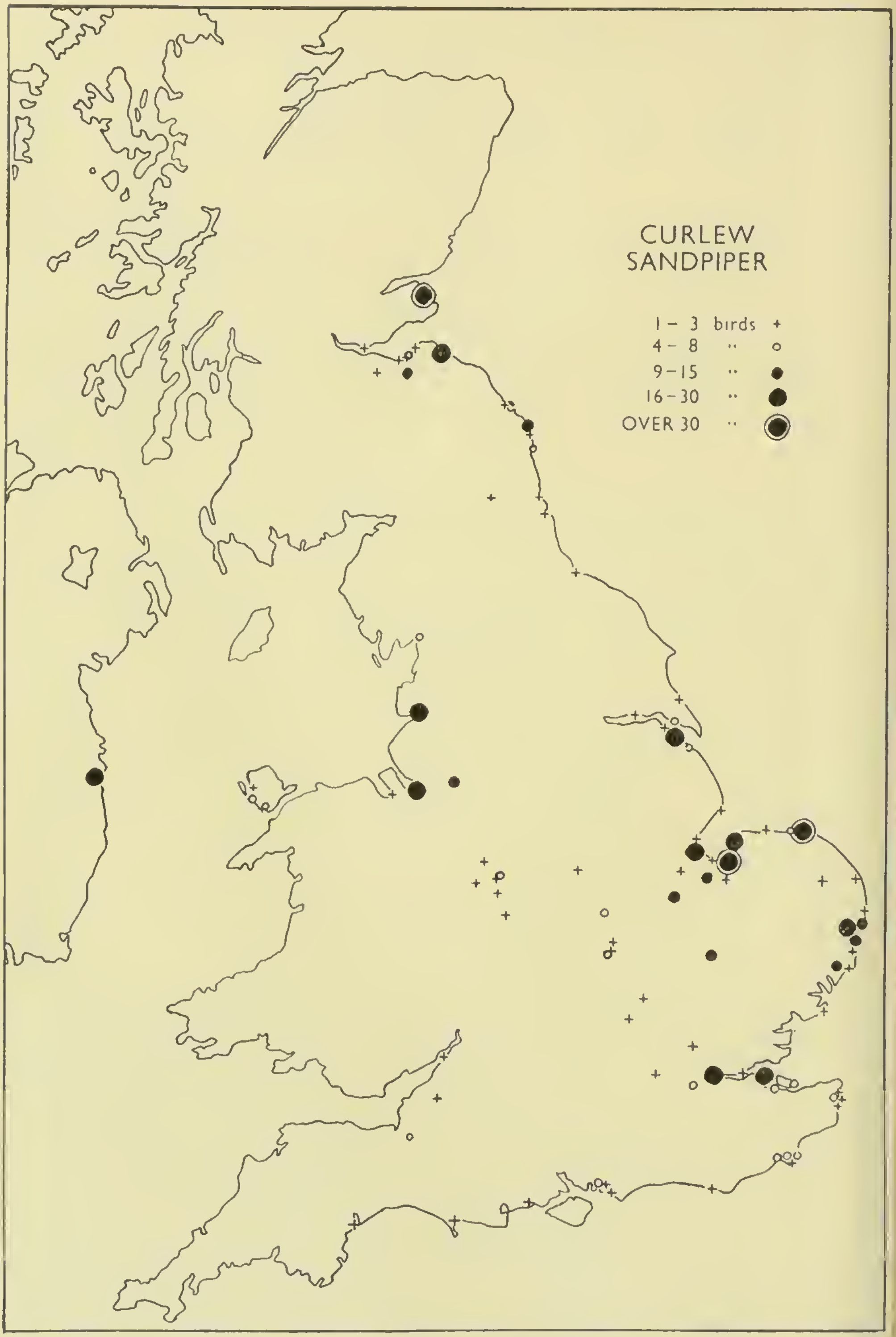
The records are much too numerous to give in detail, but the geographical pattern is summarized in Maps 1, 2 and 3, on which are marked symbols indicating the sizes of the largest flocks of each species at each locality.

The distribution in time presents no unusual features and will be described briefly. The first Ruffs as usual appeared in late June, and many occurrences were reported for July and early August, but in appreciable numbers at only a few places (Midlothian, Durham, Cheshire and the fens—all in mid-August), and except for a peak of 30 at Frodsham, Cheshire, on 20th August, these records appear to have been merely of birds trickling through in small numbers, with no clear peaks of migration. Prior to 22nd August records of Little Stints and Curlew Sandpipers were very few indeed, though there is a small group of records of the former in early August in E. England and 20 Curlew Sandpipers were noted at Benacre, Suffolk, on 20th August.



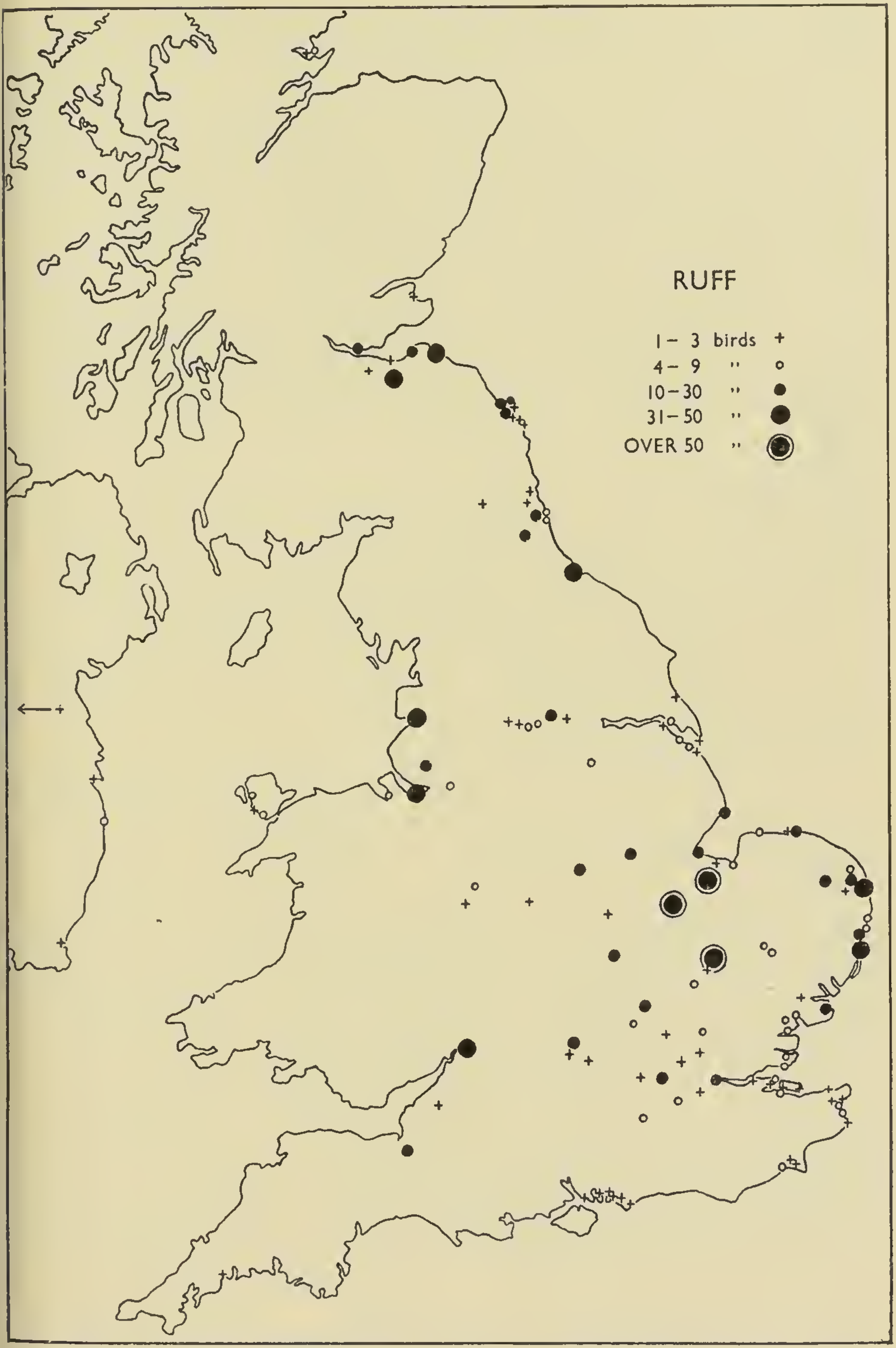
MAP I—LOCALITIES FROM WHICH LITTLE STINTS (*Calidris minuta*) WERE REPORTED IN 1953

The signs indicate the largest flocks reported at each place during the autumn.



Map 2—Localities from which Curlew Sandpipers (*Calidris testacea*) were reported in 1953

The signs indicate the largest flocks reported at each place during the autumn,



MAP 3—LOCALITIES FROM WHICH RUFFS (*Philomachus pugnax*) WERE REPORTED IN 1953

The signs indicate the largest flocks reported at each place during the autumn.

The main part of the "invasion" started with the arrival of large numbers of Curlew Sandpipers and Ruffs on 22nd-23rd August, a few Little Stints also appearing at the same time. Numbers of Ruffs built up over the next week, and the largest numbers of the year occurred about 30th August-1st September, when there seems to have been a widespread influx of all three species, though again rather few Little Stints were involved. The later position was rather confused owing to irregular observation and the large numbers already present in the country, but there is clear evidence of another influx about 5th-7th September, with rather few Ruffs, but fairly large arrivals of Little Stints, and a final arrival of all three species, conspicuous only in the south, between 18th and 20th September. Only Little Stints arrived in any numbers after this: 27 were seen at Brean, Somerset, on 23rd September, and numbers at Frodsham rose from 26 on 17th September to 45 on 24th September and 50 from the 26th to the 28th.

Most of the birds had departed by early October, but at a few places flocks of Ruffs remained late—e.g. 11-20 at Freckleton sewage farm, Lancashire, throughout October, and 30 until at least 18th October at Wisbech sewage farm in the fens. Stragglers of all three species were present at a number of localities in early November, and there were one or two winter records of both Little Stint and Curlew Sandpiper, as well as the usual scattered reports of wintering Ruffs.

The largest flocks of each species reported in 1953 were: 50 Little Stints at Frodsham, Cheshire, on 26th and 28th September; 50 Curlew Sandpipers at Lynn Point, Norfolk, on 3rd September; 80 Ruffs at Wisbech sewage farm, Lincolnshire and Norfolk, on 8th September.

It will be noted that the peak periods of immigration were largely the same for the three species, so that in the detailed analysis their migrations will be discussed together. Gibb and Tucker (1947) found only a partial correlation between the main arrivals of the two calidrine species in 1946, and it is also of interest that even the periods of peak numbers were different in that year: they showed that "Curlew Sandpiper numbers were at their height in the second and third quarters of September and thereafter underwent a fairly regular decline, while the Little Stint peak was very definitely in the second week of September, though the numbers were also quite considerable in the third, falling off very sharply at the end of the month, to rise again somewhat in early October". The peak period in 1954 was again different —about 21st-31st August for each species.

THE PATTERN OF MIGRATION THROUGH BRITAIN

The general features of the pattern of movement through the country appear to be similar to that described for the Wood Sandpiper migration in 1952, with the important difference that much of the migration now under discussion reached Scotland and the north of England. As a consequence of this, the feature of the Wood Sandpiper migration that the arrivals in the west and south-west could be considered as due to direct flight from the Continent does not apply in this case. A detailed study of the records shows that although there is a partial correlation between arrival dates in the various parts of the country, there is also a tendency for arrivals in the south and west to follow several days after immigration in the north. This suggests that although some of the records in the west follow long flights from the Continent, as shown for the Wood Sandpipers, others refer to birds which had already halted in the north or east of the country. For this to be possible, a day's flying by these waders must be of the order of 200-400 miles.

Another feature common to both investigations is the very haphazard distribution of the arrivals in space and time, with large concentrations of birds at widely separated localities, and irregular arrivals over a wide area throughout the migration period. Although there are a few well-marked peak periods of arrival (each extending over two or three days), the records do show small increases at some places on almost every day during the main passage, and it is noteworthy that the largest flocks of each species were seen on dates outside the four principal "waves" of immigration. The records of Little Stints and Curlew Sandpipers in 1946 listed by Gibb and Tucker similarly suggest a more or less continuous through passage with superimposed peaks, and the detailed observations by Dr. W. R. P. Bourne and Mr. T. C. Smout in the Wash area during the large passage of these species in 1954 confirm this interpretation (*Cambridge Bird Club Report,* 1954).

Thus although the records in 1953 are considerably more complex, and cover a larger area, than those in 1952, and although the paucity of detail in the observations causes difficulties of interpretation, the general picture of the *immigration* emerges as very similar in the two investigations: a seemingly capriciously distributed pattern of arrivals following long flights into and across the country. The weather conditions at the times of peak arrival give some indication of the factors controlling this immigration.

THE PEAK PERIODS OF ARRIVAL

22nd-23rd August.

TABLE I—COUNTS OF CURLEW SANDPIPERS (*Calidris testacea*) BETWEEN 20TH 24TH AUGUST 1953

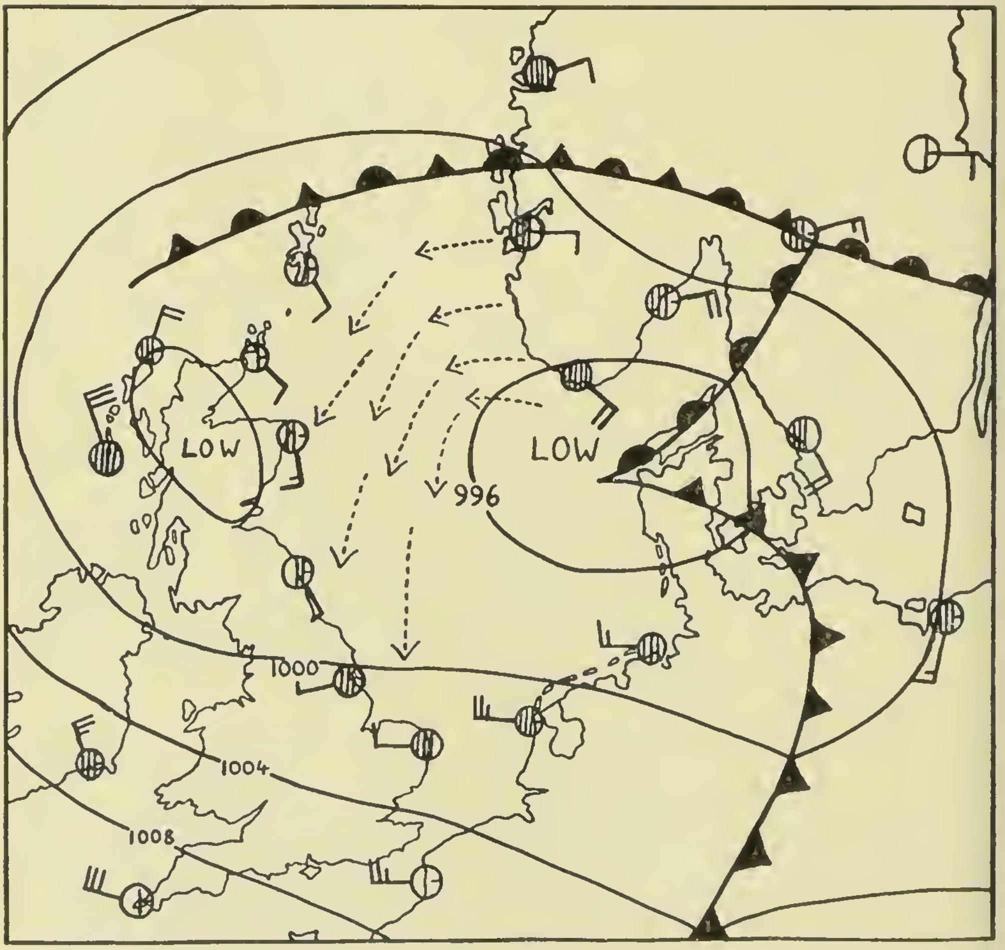
In this and other tables a dash indicates that no observations have been submitted; negative records are indicated by 0. The abbreviations "Res." and "S.F." are used for reservoirs and sewage farms respectively.

County	Locality	August 20th	21st	22nd	23rd	24th
Midlothian	Gladhouse Res.	—	—	—	12	12
East Lothian	Tynninghame	—	—	1	5	—
Norfolk	Cley	—	—	35	22	—
Lancs.	Freckleton S.F.	—	—	0	14	0
Cheshire	Frodsham	2	—	0	12	—

TABLE II—COUNTS OF RUFFS (*Philomachus pugnax*) BETWEEN 20TH AND 24TH AUGUST 1953

County	Locality	August 20th	 21st	 22nd	 23rd	 24th
Midlothian	Gladhouse Res.	8	—	15	25	35
Norfolk	Norwich S.F.	—	—	2	—	10
Cambs.	Cambridge S.F.	3	4	12	19	19
Cambs.	Peterborough S.F.	—	—	5	37	—
Middx.	Perry Oaks S.F.	—	—	7	14	—
Lancs.	Freckleton S.F.	—	—	3	1	4
Cheshire	Frodsham	30	—	40	34	—
Co. Mayo	Lough Carra	—	—	—	1	3

The numbers of Curlew Sandpipers and Ruffs at selected localities in this first large "wave" are shown in Tables I and II. Other records of Ruffs at less frequently-watched places included 42 at Breydon, Norfolk, on the 22nd; 12 at Teesmouth, Durham,



MAP 4—WEATHER CONDITIONS AT 1800 HOURS G.M.T. ON 21ST AUGUST 1953
The dotted arrows indicate the suggested routes followed by Curlew Sandpipers (*Calidris testacea*) and Ruffs (*Philomachus pugnax*) after leaving the Continental coast.

on the 23rd; 44 at Wisbech sewage farm on the 23rd; 14 other records totalling 54 birds, mainly on the 23rd; and two other records of arrivals of unspecified numbers. Nine other records of Curlew Sandpipers suggest arrival in this period, and about a dozen Little Stints were also noted.

The arrival was thus more or less simultaneous on the whole of the east coast, but perhaps slightly earlier in the north—most of the arrivals in the north were on the 22nd, and at Cambridge at least the influx on that day was late in the evening. This suggests that the birds had left the Continent in S. Norway, for an (upwind) approach from Holland could scarcely lead to such simultaneity of arrival. Map 4 illustrates the meteorological situation on the evening of 21st August: with a depression immediately to the south the weather on the S.W. Norwegian coast was typical of that leading to trans-North Sea "drift", with heavy cloud cover and easterly winds. It seems probable that the birds crossed the North Sea after being disorientated and deflected westwards out to sea by these conditions. During the night, however, the depression over Scotland degenerated into a weak trough, and by morning the winds were light northerly in Scotland, becoming westerly over England, under the influence of the depression off S. Norway alone. In the near-calm conditions which developed over much of the North Sea during the night the birds must have re-orientated themselves to south-west or south, in order to make a landfall on the east coast of Britain on the 22nd. The suggested routes followed by the birds are shown on Map 4 as dotted arrows.

Prior to the crossing of the North Sea the winds over S. Scandinavia had been S.E. for some time (see Map 4), and the movement may perhaps have originated in the Baltic area, and have been brought to S. W. Norway by some kind of drift process. It is important to emphasize, however, that the North Sea crossing was not a true drift (the arrivals in England occurred in fact with an offshore wind), though it was initiated in typical drift-producing weather conditions.

This interpretation of the immigration suggests that birds arrived in Britain flying south-west or south (though it is clear from the records that the precise pattern of migration varied slightly from day to day and from species to species). The distribution of places where large numbers of Ruffs occurred—Gladhouse, Teesmouth, Wisbech, Peterborough, Cambridge, Perry Oaks, Breydon—is interesting, and suggests that the birds on arrival may have followed the coast southwards, turning into conspicuous estuaries: this is an interesting clue to the otherwise rather mysterious way in which these waders find suitable feeding-sites. The concentrations at Freckleton and Frodsham in the N.W. may have arisen in a similar way from birds following the west coast after crossing the country.

30th August-1st Sepember.

The records at this period are rather difficult to analyse, but indicate an influx of all three species which appears to have been fairly widespread over the country. The largest numbers of Ruffs occurred at this time—the records include 50 at Tynninghame, E. Lothian; 38 at Teesmouth, Co. Durham; and peaks of 70 and 50 at Wisbech and Peterborough sewage farms, among many other records of arrivals, most of which referred to 30th August. The same day produced records of six flocks of between 10 and 24 Curlew Sandpipers. 19 records of Little Stints, totalling 64 birds, also suggest arrival in this period.

At this period a complex low pressure system was again affecting the North Sea area. The weather in Scandinavia shows no special features, and the most probable area of origin of this movement on the Continental coast seems to be in Holland. During the night of 29th-30th August the passage of two fronts across this coast led to a brief interval of rain and S.E. (offshore) wind. If this was responsible for the departure of the birds from the Continental coast the birds recorded in southern England must have re-orientated themselves to the west or south-west, as the wind returned to westerly after the passage of the second front; those seen further north correspond with typical drift-migrants. This interpretation of the influx must, however, be regarded as provisional, as the arrivals in the north may have been due to direct passage from Denmark or Norway, following the partial clearance of cyclonic weather there on the 29th.

5th-7th September.

The records of arrivals in this period may be summarized briefly as follows:—

Little Stint: a number of records on all three days, with peaks of 14 in Midlothian and 13 in East Lothian on the 6th.

Curlew Sandpiper: 40 in East Fife, a peak of 23 in Lancashire and 14 in Lincolnshire on the 6th, among other records totalling about 90 birds.

Ruff: a number of rather confused records of arrivals on the 5th and 6th.

At this period calm anticyclonic weather prevailed throughout the whole of the North Sea area; there is no clear indication of the origin of this movement, but from the number of records in Scotland it seems likely that some birds crossed the North Sea from Norway. The birds may therefore have been taking advantage of the good migrating conditions, as the low-pressure weather cleared from S. Scandinavia during the course of 5th September, and the records from S. England may similarly have been due to redetermined passage from further north within Great Britain, or from further east.

18th-20th September.

TABLE III—COUNTS OF LITTLE STINTS (*Calidris minuta*) BETWEEN 17TH AND 21ST SEPTEMBER 1953

County	Locality	September 17th	18th	19th	20th	21st
Suffolk	Minsmere	—	—	17	25	—
Cambs.	Cambridge S.F.	3	6	—	6	6
Middx.	Perry Oaks S.F.	—	—	10	10	—
Lancs.	Freckleton S.F.	—	12	15	18	19
Cheshire	Frodsham	26	—	—	34	—
Staffs.	Bellfields Res.	—	6	10	11	—

Table III gives selected counts of Little Stints in this period. There is no evidence for any very widespread influx of Ruffs, but some numbers of Little Stints were seen—there are other records of about 30 birds which suggest arrival—and numbers of Curlew Sandpipers rose by about 95 on the 19th and 20th. The main immigration at this period seems to have been confined to the southern half of England.

The prevalent meteorological situation is strongly reminiscent of those conditions leading to the main arrivals of Wood Sandpipers in 1952, which affected the same parts of England. Until 18th September the winds were westerly over the southern North Sea coast, and these died away during the night of the 18th/19th, turning to S.S.E. during the night of the 19th/20th before the fronts of a depression approaching Scotland from the Atlantic. As was suggested for the Wood Sandpipers, the birds seem to have left the Continental coast at about the time and place that the winds ceased to blow from the west.

DISCUSSION

The records received are not sufficiently detailed to add significantly to previous conclusions on the *general* nature of the immigration from the Continent. They support conclusions obtained from the Wood Sandpiper records of 1952 that the migration into Britain progresses fairly steadily whatever the weather conditions, that the birds fly in long "hops" from one place to another, and that the distribution of arrival localities is rather haphazard from day to day. The four peak periods in 1953 analysed above tend to add to the complexity of the picture. They suggest that the large immigrations took place from both Norway and Holland, and in several types of weather conditions. When analysed further, however, they suggest that:

(i) in particularly unfavourable weather these waders can be disorientated and driven out to sea in a manner typical of drift;

(ii) that some birds are capable of re-orientating themselves during sea-crossings after such drift (23rd and 30th August);

(iii) that the birds are also prepared to undertake North Sea crossings "voluntarily", either in anticyclonic weather (6th September) or when weather no longer favours adherence to a guiding-line (19th-20th September).

The causes of the unusual numbers in 1953 are less easy to determine. The hypothesized sea-crossing from Scandinavia to Scotland in anticyclonic weather on 6th September involved sufficiently large numbers of birds to be termed unusual, hence suggesting that the birds were then unusually far to the north-west. It seems possible that a drift on the night of 21st/22nd August (Map 4), or some similar process, may have deflected a large mass of birds north-west into Norway, leading to unusually large numbers being on the North Sea coast (and hence susceptible to the various factors causing deflection into Britain) throughout the autumn.

This explanation, though plausible for the Little Stint and the Curlew Sandpiper, whose western fringe must have a markedly westerly "standard direction" to reach the North Sea at all, is difficult to apply to Ruffs, which must normally migrate much nearer to due south. It may be significant that appreciable numbers of Ruffs appeared in 1953 only in the first two of the large influxes—i.e. the two attributed to forced deflection by weather conditions. It seems possible that the association of the migrations of the Ruff and the other two species is somewhat fortuitous, and is caused by some more or less accidental correspondence in their migration in S. Scandinavia. All this speculation, however, is unlikely to be verified by observation in Great Britain alone.

There is, however, some information from the Continent which is in support of these conclusions. Mr. J. E. Sluiters has collected and very kindly sent to us information referring to a large migration of Little Stints in Holland in 1953: Curlew Sandpiper numbers were here only slightly above normal and details of Ruff migration were not collected. According to S. Durango, in some years numbers of Little Stints cross the Baltic and occur in Norway and Sweden, and this is associated with peak years in Holland and Britain (1946 and 1953 were specifically mentioned as years of heavy passage in Sweden). As shown above, some such process in August 1953 is necessary to account for the arrivals of large numbers in Britain on 22nd-23rd August and 6th-7th September. The onward passage of the birds left in S. Scandinavia after these early movements to Britain evidently led them through Denmark, Germany and Holland, leading to the unusual numbers there; the records from Heligoland, Wilhelmshaven, Terschelling and Amsterdam in particular show a large build-up between 13th and 20th September. This migration, as was shown above, was continued into Britain to produce the peak on the 20th. There was a simultaneous, but smaller, build-up of Curlew Sandpipers in Holland at the same period, confirming the same general picture, but it is evident that there are some minor differences between the migrations of the two species, and the analogy must not be pressed too closely from the few records available. It seems clear, however, that the migration into Britain of these two species is controlled ultimately by conditions in the Baltic area, which determine the numbers reaching the North Sea, and only proximately (as for the Ruff and the Wood Sandpiper) by the weather on the Continental coast.

SUMMARY

(1) A summary is given (with the help of Maps 1, 2 and 3) of collected records referring to a large migration of Little Stints (*Calidris minuta*), Curlew Sandpipers (*C. testacea*) and Ruffs (*Philomachus pugnax*) through Great Britain in autumn 1953.

(2) The analysis of the rather unprecise records available supports previous conclusions on the general nature of "accidental" wader migration across the North Sea.

(3) The four peak periods of immigration in 1953 are discussed in relation to weather conditions, and it is suggested that two movements originated largely in S. Norway and two largely in Holland. The causes of the movements are discussed.

(4) It is suggested that the abnormal numbers of Little Stints and Curlew Sandpipers were ultimately caused by an unusual movement across the Baltic into Scandinavia at some time prior to 22nd August.

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APPENDIX

The following is a list of all those who have contributed records. It includes a number of people who have sent records collected for local reports, etc., and other records have been abstracted from various published sources.

A. F. Airey, D. Andrew, R. M. Argent, R. H. Baillie, A. Baldridge, J. A. G. Barnes, M. Brayshaw, R. G. B. Brown, E. Byrne, J. S. Carter, R. Chislett, H. Cole, M. Cooper, Mrs. S. Cowdy, E. H Cross, J. Cudworth, R. M. Curber, R. F. Dickens, D. L. Dobbs, R. Felton, E. Giles, E. H. Gillham, F. G. Grey, H. S. H. Hall, E. Hardy, N. Harwood, M. D. Higgins, B. J. Hoadley, P. G. W. Hollands, J. N. Hollyer, H. C .Holme, R. D. Jackson, M. Jones, R. Kendall, J. Lord, E. H. Lousley, D. MacDonald, K. S. Macgregor, N. S. Malcolm, H. P. Medhurst, R. J. Milne, D. K. Mugford, D. F. Musson, Miss E. M.

Palmer, A. Pettet, P. R. Powell, G. A. Pyman, R. J. Raines, G. H. Rees, B. W. Renyard, J. Reynolds, B. M. Rogers, M. L. R. Romer, K. B. Rooke, R. F. Ruttledge, R. Scott, M. J. Seago, H. Shorrock, J. F. Simms, J. Stafford, C. J. Stevens, G. W. Temperley, A. J. B. Thompson, J. S. Trimingham, W. H. Truckle, L. Watkinson, P. R. Westall, N. J. Westwood, D. R. Wilson, K. Young.

FOOTNOTE

Since this paper was completed, striking evidence in support of the conclusions drawn here has appeared from two independent sources. Mr. Sluiters has now received counts of Little Stints made in 1953 in the area of Revtangen (Jaeren) trapping station in S.W. Norway: these showed a large influx on 21st and 22nd August, a still larger arrival (*ca.* 100 birds) between 30th August and 1st September, and a rapid decrease at some time between 2nd and 6th September, when the station was not manned. These figures confirm the close relationship adduced above between immigration into Britain and into Norway, while the fact that the second influx at Revtangen was slightly later than that in Britain, and that more Curlew Sandpipers were seen in Britain, while more Little Stints were seen on the Continent at this time, confirms the suggestion that these movements had different areas of origin, although they evidently shared the same cause.

In addition, A. Nørrevang, in a paper on the migration of the Dunlin (*Calidris alpina*) in Northern Europe (*Dansk Orn. Forenings Tids.*, 1955, vol. 49, pp. 18-49) has recently shown that large arrivals of Dunlins at Revtangen (and presumably in S.W. Norway as a whole) are due to the northward deflection of a "Baltic migration" which normally crosses Denmark and Holland. This conclusion, reached in a quite independent manner, is strikingly similar to that described here for the other two species of *Calidris*. Nørrevang lists the weather conditions under which this deflection has been recorded, and shows that only immature Dunlins are involved.

SOME NOTES ON THE RED-SPOTTED BLUETHROAT

By D. B. Peakall

The following observations on the breeding biology of the Red-spotted Bluethroat (*Cyanosylvia s. svecica*) were made at Abisko in Swedish Lapland from 14th June to 4th July, 1955. Abisko (68° 21′ N., 18° 49′ E.) is situated at the mouth of the Abiskojokk River and beside Lake Tornetrask. Although the data collected are far from complete, the fledging- and incubation-periods having been determined from only a few nests, the almost total lack of data on this subject in the literature may make these notes of interest.

NEST SITES

The Handbook (Witherby et al., 1938) states that the species "Nests in swampy ground with occasional birch trees and heath". In Abisko no preference for swampy ground was found, despite the fact that the area in which the studies were made contained a considerable amount of such ground. Eight occupied nests were found and the sites of two more examined. Five of these were in completely dry areas, four more were situated near small streams, either permanent or caused by melting snow, and only one was found in swampy ground. A better description of the habitat, as far as this area is concerned, is that the species nests in birch scrub, usually in fairly open areas, sometimes in swampy ground. It is, however, possible that the species was more common in 1955 than usual and hence its more general distribution. It was certainly more common than Lundevall's (1952) account of its 1950 status would lead one to believe; J. H. McNeile (private communication) states that the numbers vary considerably from year to year. Dunaeva and Kucheruk (1941) in South Yamal (U.S.S.R.) found that nests were situated in "areas of bushes beside streams and lakes". It appears, however, that the association is probably due to vegetation being dependent on the streams, as few Passerines were found in the open tundra. Zhitkov (1937) found that the Bluethroat failed to penetrate into tundra that was without large willow bushes and alders. It seems likely that strict association with water occurs only when suitable habitats are completely dependent on it.

NEST BUILDING

Two nests were found before building had been completed but only one was studied intensively. This nest was found shortly after building had commenced and, in all, fifteen hours were spent in making observations during this period. The nest was completed in a little over three days. The work of building was carried out by the hen alone. If the nesting material was collected near to the nest-site, the cock sat low in a birch near-by calling softly, unless engaged in feeding or territorial disputes. When the female wandered further from the nest, she was generally accompanied by the male, but he was never seen to take an active part in nest building.

INCUBATION

Incubation was carried out by the hen only. In a total of fifty visits to nests containing eggs, the female was found incubating in all but one case, when no bird was present. Two nests were found before laying commenced and in both cases the eggs were laid at intervals of a day. In one case the incubation began on the fifth egg and in the other on the fourth egg, the complete clutch in both cases being of six eggs.

Four nests were studied where the eggs were observed to hatch and, with one exception, the hatching was complete in twenty-four hours or less. The exception was the nest in which incubation commenced on the fourth egg and here hatching was spread over three days. (It should be mentioned that the onset of incubation was verified by watching the nest for several hours during that day to ensure that it was not merely casual brooding). The cock was never observed to feed the hen on the nest during incubation.

As attention was directed more towards studying those nests found, rather than finding a large number of them, few data were obtained on clutch size. The clutch size was determined in seven cases (that is visited at least twice with a time interval of more than twenty-four hours): 1 c4, 1 c5 and 5 c6; this is in agreement with Dunaeva and Kucheruk (1941), who quote 4-6, usually 6, from five nests. The clutch of four is smaller than any recorded in *The Handbook.*

The incubation-period is stated in *The Handbook* to be about fourteen days. Two nests were found before the completion of the clutch and the incubation-periods were respectively 12 and 13 days. The incubation-period is thus shorter than for the Central European race, the White-spotted Bluethroat (*C. s. cyanecula*)—*cf.* Mayaud (1938). This tendency for more rapid breeding in the Arctic has been found for other species, see for example Dunaeva and Kucheruk (1941) and Armstrong (1954).

FEEDING OF THE YOUNG

The young were brooded almost continuously for two or three days after hatching and during this period the cock was observed to feed the hen on the nest. With one exception, all the nests found hatched only a few days before my departure and therefore, my observations on the feeding of medium-sized young were confined to this one site. A hide was erected at this nest and it was watched periodically for twenty-four hours on the 1st and 2nd July when the young were four to five days old. The number of visits per hour of both sexes throughout the period of observation is shown in Fig. 1.

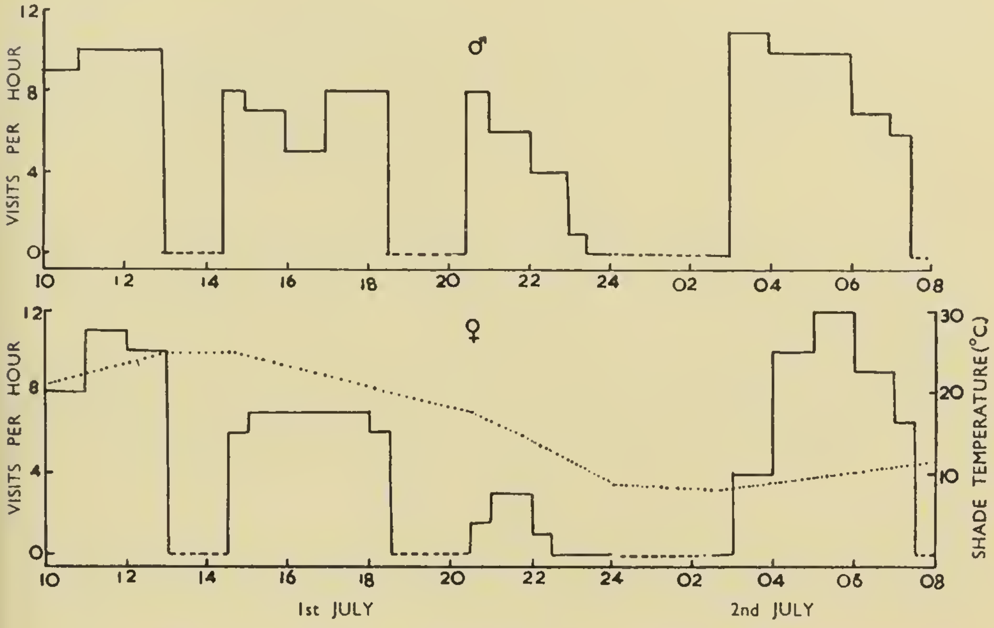

FIG. 1—VISITS TO THE NEST PER HOUR BY ADULT RED-SPOTTED BLUETHROATS (*Cyanosylvia s. svecica*) THROUGHOUT THE DAY

Central European Time is used in this figure and in the text. The dashes indicate periods when the observer was absent. The dotted line shows the shade temperature (°C.).

The diagram shows the number of visits in which food was brought to the nest. In the case of the cock, this is equal to the total number of visits made, but the hen frequently visited the nest without food for the young. On these occasions the nest was examined and sometimes the young were brooded momentarily. The female's visits to the nest were more regular than the male's. The total number of visits by the hen rarely fell below six per half-hour, except during the night when she was brooding for a considerable amount of the time. When the feeding-rate was high she did not visit the nest without food. The conclusion reached was that the hen visited the nest approximately every four to five minutes, whether or not she had collected any food, whereas the male visited the nest only when he had collected a reasonable quantity of food. In general, the male brought more food per visit than the female.

This habit of visiting the nest without food was not observed during observations on a pair of Willow Tits (*Parus atricapillus*). Here the feeding rate was considerably higher and this difference in behaviour may be correlated with the ease of finding food. No attempt is made here to correlate the feeding activity with climatic conditions as Armstrong (1954) did for the Willow Tit, Fieldfare (*Turdus pilaris*) and the Dipper (*Cinclus cinclus*). However, the shade temperature is recorded.

The number of visits in which food was brought to the nest was approximately equal for the two sexes during the day, when the shade temperature was high enough for the young to be left unbrooded; although the female did brood occasionally for short spells (30 seconds to 2 minutes) during this period. If the female was on the nest when the male arrived with food, or if the two birds arrived together, the female generally took the food from the male to give to the young. During observations made commencing at 20.30 hours, the number of feeding visits of the hen decreased markedly; the periods of brooding were longer (up to five minutes) and more frequent. The hen started continuous brooding at 22.15 hours and was still brooding when observations ceased at 24.00 hours. She was still brooding when observations were resumed at 02.15 hours and did not start feeding the young again until 03.00 hours. Thus on this occasion the period of continuous brooding at this stage of the fledging period was 4¾ hours. The working day of the cock was somewhat longer, feeding continuing until 23.15 hours and commencing again at 03.00 hours, a working day of 20¾ hours.

It was, unfortunately, impossible to identify most of the food collected for the young. During hide-work the food brought to the nest was classified under two headings, i.e. caterpillars and other insects. Most of the caterpillars collected where those of the Autumn Moth (*Oporinia autumnata*). During the watch described above caterpillars were brought in 53 times and other insect food 133 times. Although probably not significant it may be mentioned that 40 of the 53 visits in which caterpillars were brought to the nest were made by the female.

There are considerable differences between the feeding behaviour noted above and the findings of Dunvaeva and Kucheruk (1941). They found that the male took very little part in feeding the young until they were about eight days old. Detailed observations were carried out on only one nest in both cases, so that the differences might be covered by individual variation. Superficial observations on other nests at Abisko indicate that the work of feeding the young in the early stages of their fledging is carried out by both sexes. This is also the case with the White-spotted Bluethroat (Mayaud, 1939).

Due to the season being late in Lapland, I was not present when the young left the nest. I was, therefore, unable to discover whether the young leave the nest before they can fly, as was found by Hostie (1937) for the White-spotted Bluethroat. Thanks, however, to the kindness of Mr. Olle Tenow who visited the nests after my departure, the fledging period was determined in four cases.

The period was found to be 11-12 days in three cases and 10-12 days in the fourth, this last case being the nest in which incubation commenced on the fourth egg of a clutch of six; the eggs hatched over three days, but the young all left the nest within twenty-four hours. The fledging period was thus found to be less than that recorded in *The Handbook,* but is in agreement with the figure of 11-13 days found by Dunaeva and Kucheruk.

Nest sanitation was carried out by both sexes, although far more was done by the hen. The actual data recorded were:

Eaten by hen at nest	10
,, ,, cock at nest	8
Removed by hen ...	23
,, ,, cock ...	4

The impression received was that any faeces lying around the rim of the nest were removed by the first parent bird to arrive but that only the female examined the interior for faeces. The rate of defecating was one faeces per young every two hours.

ACKNOWLEDGEMENTS

The author is grateful to Dr. Sandberg and the Swedish Academy of Science for accommodation at Abisko, to the University of Hull for a grant towards travelling expenses, to Mr. O. Tenow for observations made after the writer's departure, to Misses Acland and Maxse for assistance in nest finding and with the hide work and to the Bureau of Animal Population for the loan of a translation of Dunaeva and Kucheruk's paper.

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PHOTOGRAPHIC STUDIES OF SOME LESS FAMILIAR BIRDS

LXX. BLACK KITE

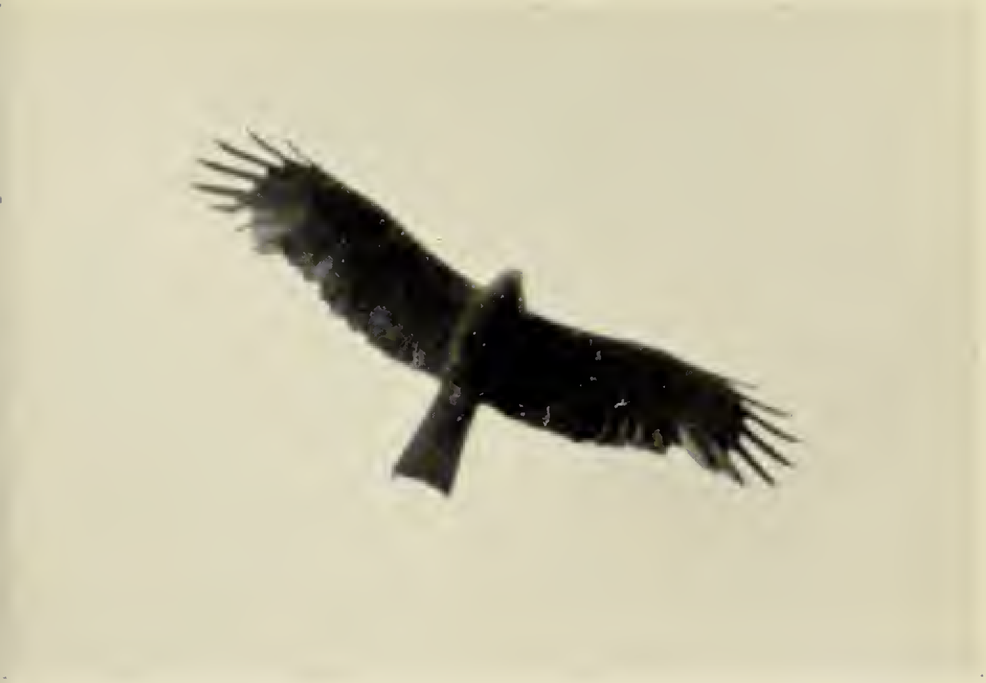
Photographed by Ilse Makatsch and S. Waurisch

(Plates 5-7)

When one considers how near to Britain the Black Kite (*Milvus migrans*) breeds on more or less the same latitude—north Germany and the eastern shores of the Baltic, a range in northern Europe not unlike that of the annually recorded Red-breasted Flycatcher (*Muscicapa parva*)—it seems surprising that it should have been noted in this country only on some five occasions. If it was a resident on the Continent and thus less likely to wander from its normal areas, this might seem less curious, but in Europe as over more than half of its range it is a summer-visitor. On the other hand, another large bird of prey which summers in that same part of Europe— the Lesser Spotted Eagle (*Aquila pomarina*)—has never been recorded in Britain at all and that neither of these birds crosses very much even into Sweden is shown by the fact that, during his work at Falsterbo in 1942-44, G. Rudebeck (*Proc. Xth Int. Orn. Congr.*, 1950, pp. 318) saw only two Black Kites and no Lesser Spotted Eagles among a total of 113,706 raptors on autumn migration.

The Black Kite has a very wide distribution in the Old World, breeding in much of Europe and Asia from Spain to Japan, throughout many parts of Africa and in the Philippines, Celebes, New Guinea and Australia. It is, however, not much found further north than latitude 60° N., except in European Russia and, much further east, in the region of the Lena river, where it extends almost up to the Arctic Circle. Its main wintering areas are in tropical Africa, the eastern Mediterranean, Persia, India, Burma, Malay and China. The species is usually divided into seven or eight races, and there is some variation in the depth of fork in the tail, in the shade of plumage and in the colour of the bill.

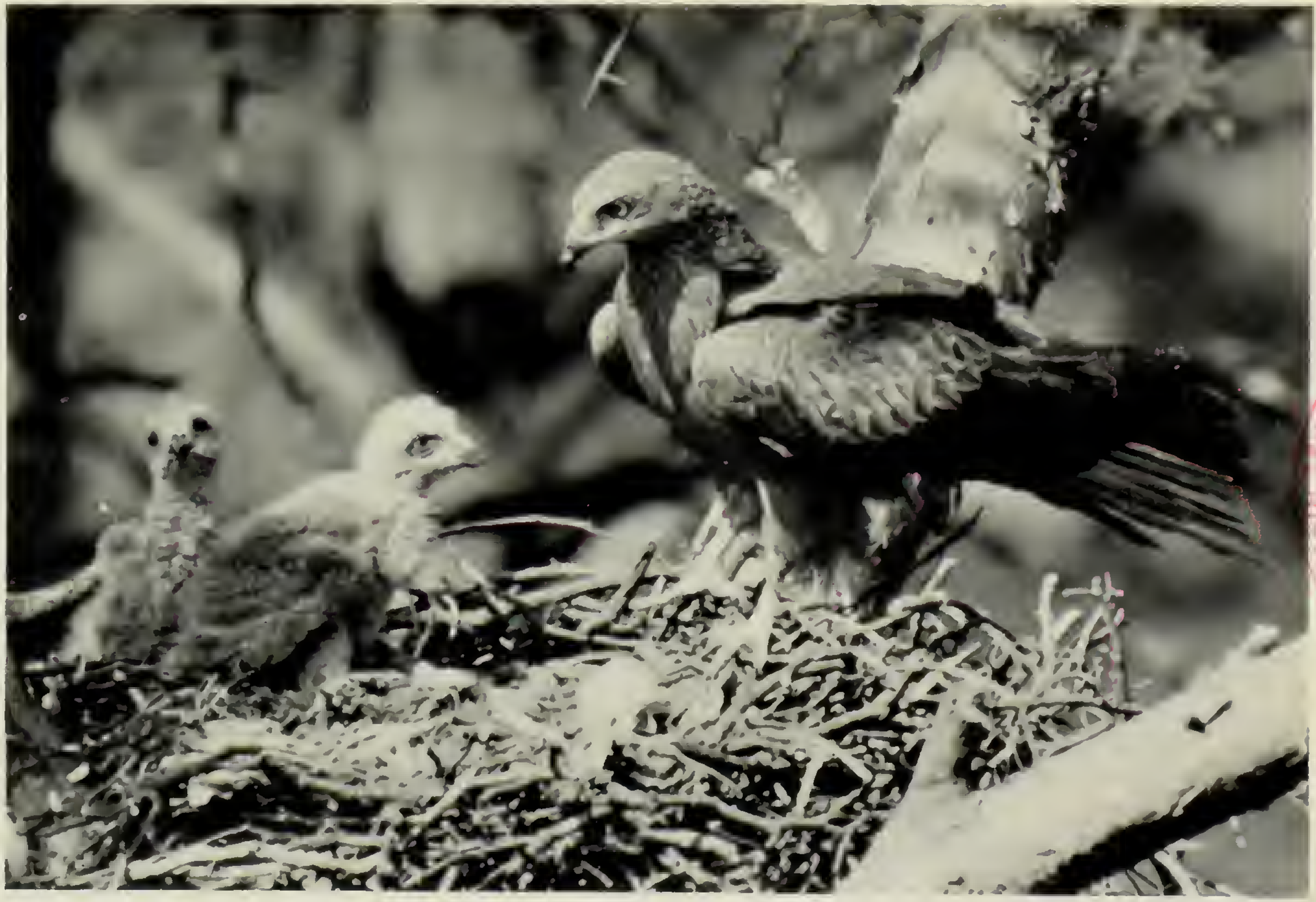
The Black Kite has only a certain resemblance to the Red Kite (*M. milvus*) from which it is easily told by its much less forked tail (plate 5, upper), its darker plumage—dark brown (not black) with only a little reddish colour on the under-parts, while the head, though paler than the rest of the body, is not so markedly so—and by its heavier, coarser, shaggier appearance (in spite of the fact that the Black Kite is slightly the smaller and averages rather lighter in weight: 800-900 gm. (1.8-2.0 lbs.) as against



Ilse Makatsch

S. Waurisch

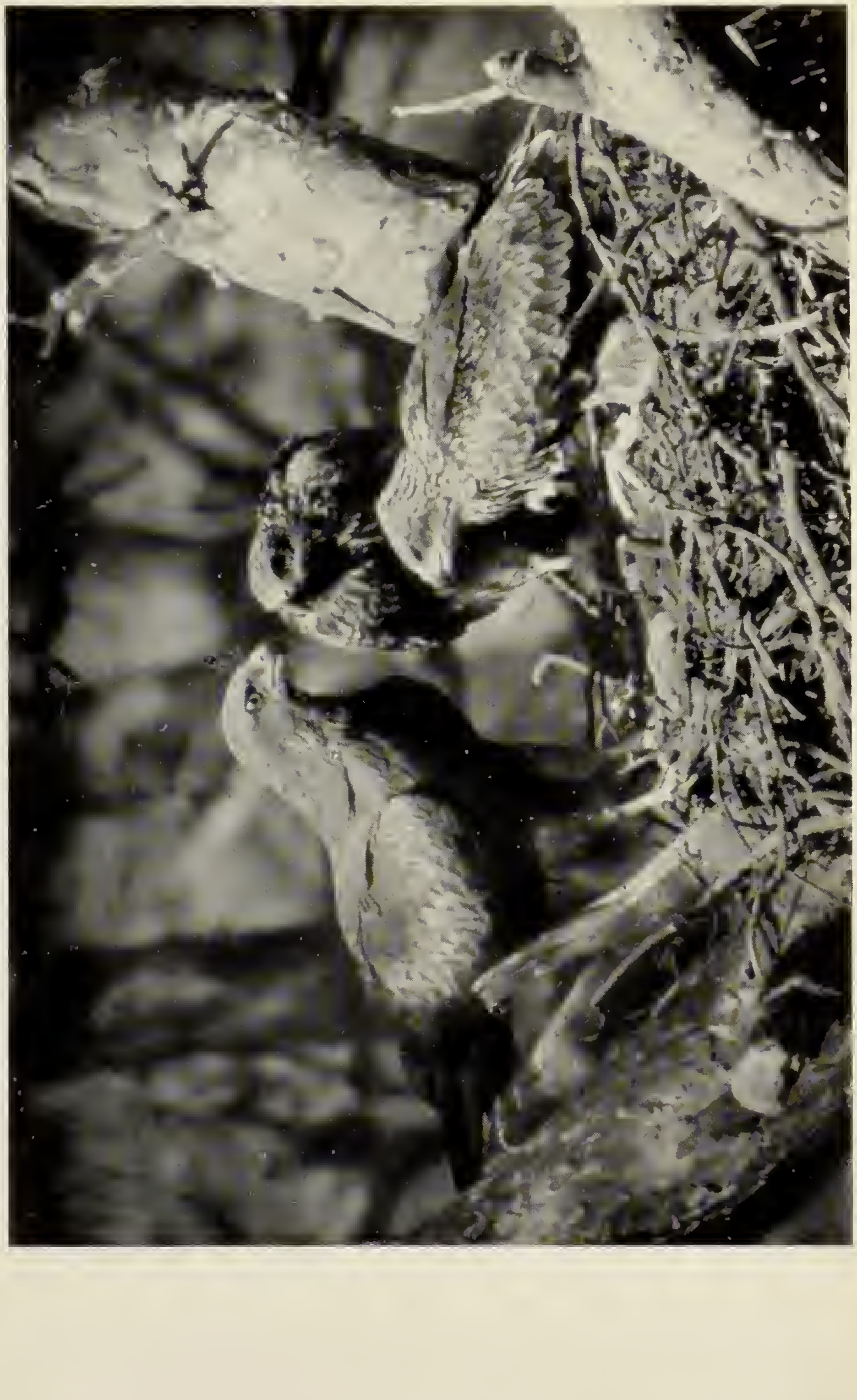
BLACK KITE (*Milvus migrans*) : AUSTRIA
The upper photograph shows well the typical flight outline with the forked tail assuming a triangular shape when spread. (see page 140).



S. Waurisch

BLACK KITE (*Milvus migrans*) : AUSTRIA

PLATE 7

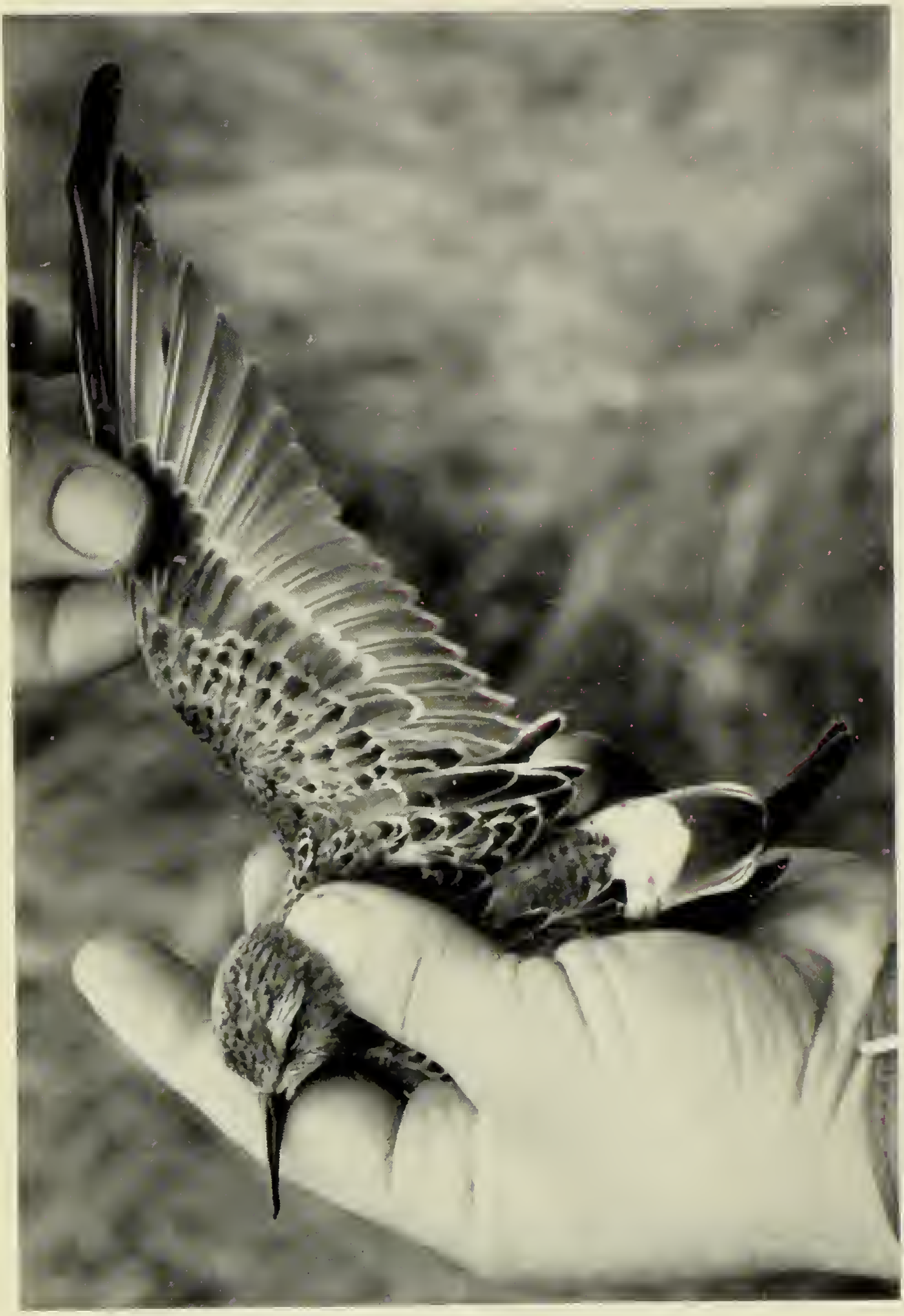


S. Waurisch

BLACK KITE (*Milvus migrans*): AUSTRIA

PLATE 8

BRITISH MUSEUM NATURAL HISTORY



J. Cunningham

WHITE-RUMPED SANDPIPER (*Calidris fuscicollis*): NORFOLK/LINCOLNSHIRE, 1956

Note the characteristic eye-stripe, short bill, ill-defined wing-bar and white patch above the tail. (see page 150).

ca. 1000 gm. (2.2 lbs.) according to the summary of information given by J. B. Szczepski in *Pomocnicze Tabele Ornitologiczne,* p. 66). The Red Kite gives a more slender appearance and seems to have longer, narrower wings, while the white patches on the undersides of its primaries are often quite distinctive (though immature Black Kites have lighter areas on that part of the wing). The Black Kite is, in fact, just as likely to be confused with the Marsh Harrier (*Circus aeruginosus*), or at least with the uniformly dark brown type of that species. In full flight the forked tail of the Black Kite is so spread that it appears square-ended, or rather triangular, a shape which is not always easy to separate from the very slightly rounded tails of the harriers. The colouring of a dark Marsh Harrier is not unlike that of the Black Kite, the two species are of much the same size, harriers and kites have a not dissimilar, leisurely, buoyant flight, and in parts of its range the Black Kite is much associated with water, so that even if it does not quarter a marsh in the same way as a harrier does, the two birds can be found in similar localities. Thus, care in separation is needed. A useful character is the way in which the wings are held in gliding. Kites usually have their wings more sharply angled at the carpal joint than harriers and, more important, a kite's wings are usually held level in the glide, while harriers tilt them up so that a head-on or rear view shows a shallow " V ". Also, Black Kites seem to make much more use of their tails in flight, often twisting them from side to side. Unfortunately, none of this can be brought out in plate 5 (upper), which, however, serves to show the proportions of the wings and the shape of the tail.

These photographs have come to us through the kindness of Dr. Wolfgang Makatsch. Plates 5 (lower), 6 and 7 show various stages in the growth of two young at a typical nest in a pine tree. These birds are often, but by no means always, social breeders: at times several nests in the same or adjacent trees give the impression of a small rookery of outsize structures and 20 or 30 birds may be seen in the air at once. The nests are built mainly of sticks by both the adults, sometimes on a foundation of the remains of some other stick nest. With the somewhat unpleasant feeding habits of the adults and their penchant for building into the nest any available rubbish from dung and earth to paper, string and pieces of cloth or sacking, the structure assumes a somewhat untidy appearance. Such pieces of rubbish can be seen in these plates. A brood of two young, as here, is the most common, though three eggs are not infrequently laid. The young spend something over six weeks in the nest and are fed by both parents.

I. J. F.-L.

SPECIAL REVIEW

By R. C. Homes

THE WILDFOWL TRUST: SIXTH ANNUAL REPORT, 1952-53, and SEVENTH ANNUAL REPORT, 1953-54. Edited by Peter Scott and Hugh Boyd. (*Country Life,* London, 1954 and 1955). 162 pages and 24 plates; 235 pages and 24 plates. Each 10s.

The activities of the Wildfowl Trust have expanded enormously since its inception in 1946. The contents of the *First Annual Report,* reviewed in this journal in 1948, consisted of the business of the Trust and accounts of the wild geese on the Severn, the first catches by means of rocket nets, the decoy and the waterfowl collection, all relatively domestic matters. Gradually the Wildfowl Trust has widened its scope until now it has a world-wide reputation as a centre not only for the study of waterfowl from all angles, through its unique collection of ducks, geese and swans, but also for its extensive research into their population dynamics. With the great accumulation of material and the limited channels of publication the expedient has been adopted of including in the annual report original scientific papers as well as short notes and interim papers on research in progress. These annual reports have thus assumed more widespread importance than is usual for publications under this heading, and while space does not permit a summary of all the reports since the first, the only one to have been previously reviewed in these pages, the contents of the sixth and seventh reports deserve a fuller mention than is customary in a short review.

In the first of these Boyd analyses, in " White-fronted Geese statistics, 1952-53," the information from the study of the wild flock of Whitefronts (*Anser albifrons*) at the New Grounds. The average proportion of first-winter birds to adults has ranged during six winters from 21% to 37%, but in the course of more frequent counts in 1952-53 it varied between 26% and 41% at different periods, the highest figure being in early December. In four consecutive years the mean brood-size deduced from studying family groups was between 2.94 and 3.25 in three of the winters and 3.64 in the other. White-fronted Geese remained in family groups throughout the year, the group sometimes including one or more additional adults, possibly the offspring of the previous year. K. Lorenz informed the author that among semi-captive Grey Lag Geese (*A. anser*) immature birds may be re-admitted to the family after the breeding-season following that of their birth. The relatively few first-winter birds not in family group shows the strength of the mechanism for preserving family coherence. An estimate that of 100 geese alive at 1st January only 57 survive until the following 1st January is given only tentatively and seems to be based as yet on too small a sample and on too many uncertain hypotheses, notably that most of the ringed geese visiting the

New Grounds in one season and surviving until the next will reappear there and be recognised, and that the death-rate is about the same for all age-classes over six months. The proportion of second- and third-winter birds is thought to be increasing, or the proportion of older birds decreasing, which is a condition of a growing population. Although some species have been proved to breed when two years old, there is no evidence of this for White-fronted Geese. It is said that conclusive proof that pairing takes place during the winter has yet to be obtained, but two pages later we read that "pair formation occurs during the winter."

In short notes, B. W. Tucker's view (*The Handbook,* vol. III, p. 186) that the variability of belly markings is not directly dependent on age or sex is confirmed. A summary is given of a report by Boyd in *Behaviour* on hostile encounters between members of this species in winter flocks. The large majority of attacks are successful and many uncontested. First-winter birds not in families are inferior to all other classes. Paired adults are superior to single adults and also to first-winter birds still with their families. Young birds in families, though subordinate to members of pairs, tend to be superior to single adults. Parents are superior to all other classes. Family-size provides a second criterion of rank, large families being superior to smaller ones. There is very little fighting within families, and geese of other species are tolerated. Frequency of attacks is affected by composition and density of flock, the general level of activity, disturbance and the accessibility of drinking places. Conflicts for food are rare.

In " Experiments on the following reactions of ducklings " Eric Fabricius and Hugh Boyd give a preliminary outline of their studies. Other notes and papers refer to recoveries and recaptures of ringed ducks and geese, the operation of Berkeley and Borough Fen Decoys, experimental studies and causes of death among the captive birds, some notes on the Director's visit to South America (with important field observations on little known species), a visit to the Delta Waterfowl Research Station and other topics.

"Some results of recent British Mallard ringing" compares birds ringed at Abberton in Essex and at Slimbridge. While the results are of interest, it is not surprising that they are in sharp contrast in view of the differences in climate, exposure and shooting-pressure between the two localities. Ringing can teach an enormous amount, but under these conditions the economists' supposition of "other things being equal" is far from applying, and there are some problems such as the differential distribution of the sexes in place and time which cannot be studied profitably without taking into account observational data.

In the period covered by the *Seventh Annual Report*, the Wildfowl Trust assumed responsibility for the National Wildfowl Counts made on behalf of the International Wildfowl Inquiry and also for the administration of General Wainwright's ringing station at Abberton Reservoir. From a primary concern with studying the geese at the New Grounds and the waterfowl in the collection, the emphasis has now extended to reserch on a national, and indeed international, scale into wildfowl problems in general. The wider responsibilities have led to the formation of a Scientific Advisory Committee including experts on many kindred subjects and representatives of most of the various organizations concerned in the study of birds in Britain.

The latest report is devoted very largely to the Pink-footed Goose (*A. arvensis brachyrhynchus*). In the autumns of 1953 and 1954 over 3,000 Pinkfeet have been ringed in Britain, and over 9,000 were captured in Iceland in the summer of 1953. Of 1,558 Pinkfeet caught in the autumn of 1953, 15.4% were carrying rings, and in 1954 the proportion of *adults* wearing rings was about the same as in the previous year, but no young had been ringed. One bird has now been recaptured three times, and six others twice. Geese apparently paired when ringed have been recaptured apparently still paired. Some young birds have been associating with their parents beyond the normal first year.

In a paper entitled " The Wildfowl Trust's Second Expedition to central Iceland, 1953 " by Scott, Boyd and W. J. L. Sladen, the size of the colony in central Iceland is estimated from local recapture data at 8,200 adults and 10,200 goslings. There were few one-year-old birds present, but two-year-olds were distributed throughout the colony though believed not to be breeding. Of 382 adults ringed in Iceland in 1951, 18.3% were recaptured in 1953, but only 4.7% of the goslings. Based on the annual survival factor calculated from recoveries the recapture of goslings (i.e. two-year-old geese) was only half the number expected. As pairing of this species occurs as much in autumn and winter as in spring, it may take place when members of many different colonies are intermingling on the wintering-grounds and pairs could easily be formed between birds of different origin. It follows that one of such a pair cannot return to its own birth-place, providing a tentative explanation of the small number of goslings recovered.

Gosling mortality could not be estimated by observation at the colony owing to the aggregation of families in large flocks, but a comparision of the recovery and recapture in Britain of goslings ringed at different stages of the fledging-period suggests a high mortality in the first few weeks, falling off rapidly after the middle of July. Heavy losses are thought to occur again on first exposure to shooting in Britain in early October, and mortality between hatching and mid-October (when rocket netting has usually started) is estimated at 60%. The proportion of juveniles to adults in autumns following the two expeditions to Iceland does not in any way suggest that abnormal losses of goslings have resulted from the methods of capture in Iceland.

Boyd and Scott also contribute a paper " The British Population of the Pink-footed Goose, its numbers and annual losses".

From ringing adults there appears to be little interchange of population between the Greenland and Icelandic Pinkfeet wintering in Britain and the Spitsbergen birds wintering in Denmark, Germany and Holland: of 41 recoveries of Pinkfeet ringed in west Spitsbergen in 1952 and 1954, none were in Britain, 23 in Germany, 10 in Denmark, 6 in Holland, and one each in Belgium and France. As a start to assessing the world population of Pinkfeet an estimate is made of the British population. Results of observational data from all sources range as widely as from 26,000 to 70,000 over the last five years. An analysis of ringing statistics by a formula given by Bailey gives the number of Pinkfeet in Britain on 1st November as 52,000 in 1951, 37,000 in 1952 and 49,600 in 1953, but the first figure is judged unreliable and the others still have a standard error of 17%. A longer series of catches should increase the reliability of results, the chief problems being the seasonal variations in the proportion of young birds and the different death-rates of adults and young. Attempts to assess the annual death-rate after arrival in the British population are complicated by two potential variables, the annual death-rate itself and the reporting rate, since many marked geese which have been shot are never reported. Calculations based on recaptures have shown a wide margin of error owing to the small numbers involved but, using recoveries instead and making the assumption that the annual death-rate itself is constant while the reporting-rate varies, the annual death-rate is then 26 ± 1.6% for adults and 42 ± 2.8% for juveniles in their first year. It is demonstrably untrue that the reporting-rate is constant as interest in the novelty has soon worn off.

Averaging at 46,300 the estimates of the population of British Pinkfeet in October 1953 and assuming the juvenile-adult ratio in the 1953 catches based on over 1,500 birds to be representative, the approximate number of adults and juveniles would have been 31,200 and 15,100 respectively. Using the annual death-rate figures from November to October of 26% for adults and 42% for juveniles, the total losses in the year following the example would have been 8,100 adults and 6,300 juveniles. Since 88% of the casualties to Pinkfeet reported over a period of nearly four years have been due to shooting, a loss of 12,700 geese in one year would have been attributable to this cause. Too many uncertain factors are involved, however, for an assessment of the accuracy of this figure.

In " The role of tradition in determining the winter distribution of Pinkfeet in Britain," Boyd finds that the Pinkfeet of the Tay, Solway and E. England are relatively sedentary, those of S.E. Scotland relatively mobile. Adults show greater attachment to the region of marking than those marked in the first autumn of life. Pinkfeet frequenting the Humber and the Wash seem to constitute a single population.

In two papers by William H. Elder it is reported that the incidence of shot found by fluoroscopic examination of nearly a thousand grey geese, mostly Pinkfeet, in Britain was closely similar to that in Canada Geese (*Branta canadensis*) in the Mississipi valley. So many factors are involved that deductions from this are dangerous at present. Adult Pinkfeet were found to be heavier than juveniles of the same sex, and males to be heavier than females of the same age-group. Average weight declined progressively from adult males to adult females, juvenile males and juvenile females, all but the last comparision being statistically significant. Similar results were obtained for Grey Lag Geese but the samples were small.

Examination of wild Pinkfeet caught in Iceland and Scotland has revealed no evidence of *Aspergillosus fumigatus* or any other potential pathogenic fungus, though the first is a common disease in captive birds and has caused considerable mortality in the collection. It is still thought that it must sometimes occur in the wild. A three-year study of the disease is being made at the New Grounds. Losses of captive birds from infestation with the stomach worm, *Acuaria,* have been reduced by taking the water-supply from a well instead of from a stream.

The first of four articles on Pinkfeet abroad consists of extracts from the diary of S. W. P. Freme, who in 1929 with W. M. Congreve, as the first to prove that the breeding geese of central Iceland were of this species. Notes on a visit to north-central Iceland in 1954 by G. K. Yeates describe the geese of one of the river gorges where many appeared to be non-breeding—Scott suggests that this may be due to pairs of mixed age, one bird being immature. The middle of May is given as the laying season as compared with the middle of June in *The Handbook,* the latter possibly applying to Greenland and Spitsbergen. The pair feed together, the nest being then left unguarded. A report by N. G. Blurton-Jones and R. Gillmor on the gathering and departure of Pinkfeet in central Iceland stresses that the geese leave the inland feeding-grounds when these are all covered by snow and then migrate without stopping on the coast. They move off downwind and are carried to Britain by south-east drift, in the almost invariable conditions said to follow any depression over Iceland causing snow in the interior at this time of year. Their movement is thus highly concentrated and the birds respond to an immediate external stimulus, whereas Passerines breeding in Iceland have a long period of migration (from mid-July to October) and move first to the coast, whence they depart eventually in fine weather before conditions at that level become bad. The stimulus in their case is thus primarily an internal one released by good flying conditions. An expedition to west Spitsbergen in 1954, which is the subject of another paper, has already been mentioned: in addition to the Pinkfeet, 23 Barnacle Geese (*B. leucopsis*) and 74 Light-bellied Brent Geese (*B. bernicla hrota*) were caught.

A section on the Wildfowl Counts decribes the results of a statistical examination of methods, which suggests that year-to-year fluctuations due to weather conditions may be more likely to confuse population trends than will any lack of precision due to errors in counting, day-to-day weather variations, disturbance or other incidental factors affecting counts which are only made at monthly intervals. In an effort to overcome any bias from the sample not being fully representative of wildfowl habitats, other waters not counted regularly will be visited occassionally to show up any gross variations outside the sample, and a register of all waters in the country suitable for wildfowl is to be compiled.

So far time has not permitted any correlation of the information obtained from ringing with the results of the counts, or indeed with the mass of distribution data in some of the county bird reports and the records of the societies compiling them. There seems to be a fertile field for more integration, and we can hope that time will soon be available for research into the movements and population of ducks using all the sources of information.

In a summary of a pamphlet, "National Wildfowl Counts, 1952-54", G. Atkinson-Willes gives maximum totals of Mallard included in the counts as being in the region of 40,000 in the period between mid-November and mid-December. An increase from August to mid-November is attributed to immigration, but the presence or absence of frost in N.W. Europe between October and the end of December is not thought to have any great influence on the numbers of Mallard in Britain. The scope of the counts is still unsatisfactory in Ireland, Wales, N.W. Scotland and the Solway, from which more assistance would be welcomed.

Nothing has yet been said about the wild geese at the New Grounds as details of these appear in other reports. Briefly, nearly 5,000 Whitefronts were seen in January 1953 (the most since counts started there in 1933) and up to 3,800 and possibly more in the following winter. Lesser White-fronted Geese (*A. erythropus*) were seen in both winters (*antea,* vol. xlviii, p. 326), a young Red-breasted Goose in early 1954 (*ibid.*, p. 136), the usual Pinkfeet early in the winter and a sprinkling of other species. Recoveries of ducks and geese are listed in detail. One Teal (*Anas crecca*) ringed at Borough Fen in November was recovered in Newfoundland four weeks later, and another in Italy two winters after ringing. Winter recoveries of Shoveler (*Spatula clypeata*) are mainly from France and Ireland, but one was found in Finland in August, the first from Scandinavia. Six recoveries of White-fronted Geese within the breeding-range are from the Kanin Peninsula (2), Tchesk Bay, Kolguev Island (2) and Novaya Zemlya. Evidence accumulates that these geese leave Britain in a westerly rather than a northerly direction: one recovery as far east as 69° E in latitude 55° N suggests the possibility of origin from a breeding-place even further east than those mentioned. A disproportionately large number of ringed White-fronts is seen at the New Grounds in late January, February and March, compared with earlier in the winter. Flocks of this species stay on the German coast until driven out by frost.

Enough should have been said to show the considerable interest of the Wildfowl Trust's valuable study of goose populations, particularly of the Pinkfoot. No species wintering only in Britain has previously been studied in this way, and while the results so far may be subject to an appreciable percentage of error and the assumptions made are sometimes open to question, far more has been achieved than would have been thought possible in the time, and not only the results but also the technique of interpretation are of extreme interest. As data become available for a longer series of years there is good hope of attaining not only the objective of a basis on which to measure wildfowl fluctuations as a guide to conservation policy, but also of completing population studies of considerable biological value.

NOTES

Purple Heron in Surrey.—On 18th September 1955 I disturbed a juvenile Purple Heron (*Ardea purpurea*) in a patch of rather close-growing reeds at the south end of Frensham Little Pond, six miles N.W. of Haslemere, Surrey. First seen indistinctly in the reeds, with which its general coloration blended very well, it appeared predominantly brown, definitely smaller than a Heron (*A. cinerea*), and more lightly built. It rose almost immediately, giving me a good view at about 40 yards as it did so. As it cleared the reeds it still appeared mainly a warm brown, but the rear half of each wing was a darker greyer-brown or slaty-brown. The bill was yellowish, with sides of the face and the throat white, the white soon merging into a warm red-brown neck; legs were brown or yellowish-brown, the feet a shade lighter. K. M. Gauntlett who was with me remarked that to him the wings appeared narrower than those of a Heron and the feet larger.

I saw the bird again on 20th September, in level flight about 100 yards away. It looked then more like the adult Purple Heron, dark streaks on the neck showing up pretty well, but on the down-beat, when the upper surfaces of the wings could be seen, the coverts were plainly brown. It was also seen on this date by Miss P. M. Bond, Miss M. Hutchinson and other members of the Haslemere Natural History Society, and it was last reported on the 25th. R. S. P. BATES

Long-tailed Duck in Northamptonshire. — On 18th December 1955, at Pitsford Reservoir, Northamptonshire, I saw a small, drab duck with a party of Coot (*Fulica atra*). It was watched diving and swimming for some 45 minutes at distances down to 100 yards. From its small size (appeared slightly smaller than the Coot), its very short, dark brown bill, its white face with dark grey crown and nape extending into a patch on each cheek, from its uniformly greyish-black back and wings and its white under-parts shading into grey on the flanks, it was identified as a first-winter Long-tailed Duck (*Clangula hyemalis*), the first record of this species in Northamptonshire. In company with J. R. Beck, I saw the bird again on 27th December. A full description together with a sketch has been submitted to the Editors. L. S. TAYLOR

Buzzard killing Tawny Owl.—On 20th October 1955, on my farm at Boyton, Cornwall, I saw a Buzzard (*Buteo buteo*) take and kill a Tawny Owl (*Strix aluco*) while the latter was perched in a large plane tree. The initial attack surprised the owl from behind. The two birds soon fell to the ground and the majority of the fight took place there. The whole incident lasted nearly 15 minutes, as the Buzzard had the greatest difficulty in releasing the owl's hold on its legs. So entangled were they that I was able to approach to within 30 yards. After the Buzzard had killed the owl and eaten it, there was little left except the wings and legs.

Incidentally, during the summer of 1955, in the absence of rabbits, many low-nesting birds such as Skylarks (*Alauda arvensis*), Yellowhammers (*Emberiza citrinella*) and Reed Buntings (*E. schoeniclus*) had their nestlings destroyed by stoats. In four cases I witnessed the actual attack. G. C. WOOLTORTON

[At the present time observations on the food of Buzzards are of particular interest, particularly in areas where rabbits used to form a major proportion of the diet. Similarly, we shall be glad to receive notes on any other occurences or changes which seem connected with the absence of rabbits.—EDS.].

White-rumped Sandpiper in Cornwall.—On 17th October 1955, I saw a single wader, which at first sight I thought was a Dunlin (*Calidris alpina*), probing in the shallow water of a muddy pond on Par Beach, S. Cornwall. On approaching to within a few feet of the bird, I noted that its blackish bill was relatively shorter, the under-parts were whiter, and that when the bird lifted its wings during preening I could see white above the tail. I flushed the bird, which flew only a short distance, and could see distinctly the white upper tail-coverts contrasting with the brown distal band of the tail.

The legs were blackish; the head and breast streaked and spotted; flanks streaked more darkly; rest of under-parts white; the upper-parts were greyish-brown; the feathers of the back had dark centres and lighter edges; there was a noticeable white eye-streak. The whole plumage, except that it was of the greyer winter dress, was identical with Plate 75 in Vol. 3 of T. A. Coward's *Birds of the British Isles*. The bird was the size of a Dunlin.

Twice when flushed it uttered a characteristic short, sharp "peep" call, and twice it swam a short distance in the deeper water. It fed mainly by probing with its bill when standing in water up to its body, and it was very reluctant to fly. Mrs. G. Clayden went with me to the pond on my second visit and we sat about six feet from the bird. During our stay there, it fed, preened and even placed its bill back over between its scapulars in the attitude of sleep. It was remarkably tame.

I am satisfied that it was a White-rumped Sandpiper (*C. fuscicollis*), which makes this the fourth record for Cornwall (though there are two for the Isles of Scilly) and the first since 1870. All the records are for October. C. J. STEVENS

White-rumped Sandpiper in Lincolnshire and Norfolk.—On 13th November 1955, when trapping waders at Wisbech Sewage Farm (on the Lincolnshire/Norfolk boundary) I caught a bird, together with four Dunlin (*Calidris alpina*), which was smaller than them and different in several features. This bird was examined in the hand and compared with the Dunlin by D. K. Ballance, Mrs. A. H. J. Knight, J. N. A. Larmuth, P. E. Naylor and myself and was photographed by J. Cunningham. The photograph (plate 8) shows the short bill (24 mm.) resembling a scaled-down Dunlin's (slightly downcurved near the tip and spatulated at the end and proportionately thinner), the lack of a white wing-bar on the primaries, an eye-stripe very broad behind the eye but narrower and rather indistinct in front, the white horseshoe-shaped upper tail-coverts contrasting with a much darker tail than that of a Dunlin, and the long wings (124 mm.) projecting well beyond the tail—all characteristic of a White-rumped Sandpiper (*C. fuscicollis*). It was an adult bird and still had a few stint-like summer-plumage feathers on the back and scapulars. The breast markings ended in a distinct line—less so than in a Pectoral Sandpiper (*C. melantos*) but more so than in a Dunlin. When released, and later when it was observed in the field down to ranges of two yards, it gave the diagnostic "jeet" note, repeated up to six times, on rising. It was present during the next four days, being seen by R. A. Richardson on the 17th, but it had gone by the 19th. During this time it was watched by a number of people and the following is a summary of the interesting points noted by J. V. Boys, I. C. T. Nisbet, T. C. Smout and D. I. M. Wallace.

Size between Dunlin and Little Stint (*C. minuta*). Flight very characteristic with long, thin, almost sickle-shaped wings beating through large arcs in a way reminiscent of a Little Ringed Plover's (*Charadrius dubius*) flight. The slight wing-bar was not very noticeable in flight, but the white upper tail-coverts were very conspicuous and made the tail appear almost black in comparison. Feeding habits were much more like those of a Little Stint (though less active) than those of a Dunlin, with beak held at forty-five degrees and food picked up, not probed for. It generally fed at the edge of the water and did not wade so deep as the

Dunlin. Two observers noted a dark patch on the leading edge of the underwing showing in flight. On most days it called frequently in flight, the note being very like the squeak of a mouse (*The Handbook*) but not particularly reminiscent of a Meadow Pipit (*Anthus pratensis*) (*Field Guide*). It was usually seen in company with a few Dunlin—it was with eighty when caught—though when flushed it often broke away from the pack and was always the first to land again.

It is interesting to note that a Pectoral Sandpiper had been present at the same place for ten days and was last seen the day before the White-rumped Sandpiper was caught.

C. D. T. MINTON

Buff-breasted Sandpiper in Dorset.—On 28th September 1955, whilst watching waders on the muddy sand of The Fleet, Portland, Dorset, I saw a wader whose silhouette I did not recognize. It was about the same size as the Ringed Plovers (*Charadrius hiaticula*) and Dunlins (*Calidris alpina*) in the area; but at a distance of about one hundred yards its short pointed bill, like a Little Stint's (*C. minuta*), its upright stance, and rather long legs were noticeable. Under ideal conditions it was soon possible to take a detailed field-description, from which I was able, on consulting *The Handbook,* to identify the bird as a Buff-breasted Sandpiper (*Tryngites subruficollis*).

The bird was last seen on 11th October, by which date it had been watched by many observers including K. B. Rooke, J. F. Monk, Bruce Campbell, W. B. Alexander, J. C. Follett and J. S. Ash. It was trapped and ringed by the last-named observer on 9th October, when it was decided that the bird was in first-winter plumage: there was a single adult feather in the mantle with a broader rufous margin. The following is a brief summary of the copious plumage- and field-characters recorded by various observers:—*Crown, mantle, back and scapulars*: reminiscent of Ruff (*Philomachus pugnax*) in autumn plumage; dark centres to warm brown feathers, those of mantle and back having fairly broad buff edges, producing a rather scale-like appearance. *Sides of head*: buffish, with a pinkish tinge, rather darker than under-parts. *Under-parts*: uniform pale buff, tinged pinkish, faintly streaked or speckled with brown on sides of upper breast; belly, flanks, and under tail-coverts creamy-buff, definitely not white. *Under-wing*: mostly white, except darkish patch at carpal joint, and apparently bordered blackish. *Tail*: no white anywhere; in flight upper tail-coverts not distinct from rump and back. *Bill*: about equal to length of head; dark, straight, slender and finely pointed; stint-like. *Legs :* longer than Dunlin's, yellow; "knees" usually rather bent when feeding. *Iris*: dark and " beady." *General*: about size of Dunlin, with more slender body and longer legs; an elegant bird with a small plover-like head on a long neck, and with Ruff-like plumage; the wing-tips projected about half an inch beyond the tail.

Most of its food was obtained by pecking amongst *Suaeda, Atriplex,* and grasses, in which it spent most of its time. Against such a background of vegetation it was most difficult to see.

Call note: flight note recorded as a distinctive " chwup " or " chüüp "; when anxious on the ground, a sharp repeated "wit," " weet," or " wick." In the laboratory its wing (straight) was 130 mm., in length and its weight, 62.0 gm. (18.00 hours G.M.T.). On 2nd October J.S.A. noted on one occasion, when the bird was closely surrounded by several observers, an interesting form of displacement activity. The bird slowly raised each wing alternately, stretching it fully, and trembling it as it inclined the body sideways. M. D. CROSBY

Status of Great Black-backed Gull inland in Scotland.—Residing as I do in the district which is popularly acclaimed to be the "heart of Scotland", I was particularly interested in D. G. Andrew's note under this heading (*antea,* vol. xlviii, pp. 455-456). In Strath Tay, north from Dunkeld to Kenmore, and up the Tummel valley, from its junction with Tay at Logierait, to Pitlochry, the Great Black-backed Gull (*Larus marinus*) occurs in small numbers during the winter months. Normally it appears to be only a daylight visitor to this area, most of the birds flighting up from roosts south of Dunkeld, but some have been observed, at first light, flying eastward from the direction of Loch Tay. Although it is to be found from time to time in the vicinity of refuse-dumps, notably near Pitlochry and Aberfeldy, where it scavenges with the far more numerous and more regular Herring Gulls (*L. argentatus*), it is in this district typically a bird of the riverside and the "haugh" lands, especially when flooded, and not of the moorland.

Andrew mentions that, in the southern Highlands and Argyll, E. A. Blake writes that "its distribution is that of the Black-faced Sheep", but that does not seem to be so in this central area, where its appearances are undoubtedly more closely related to the distribution and strandings of dead and dying kelt salmon. These depend to a great extent on the height of the river, but, quite apart from the presence of dead salmon, with spate conditions and flooding of the arable fields, all our winter gulls, Herring and Common (*L. canus*), as well as the much scarcer Black-backs, are more numerous and more widely distributed.

Away from the Strath odd birds, or pairs, do occur in the hills almost at any season, but only occasionally, and they are not the feature that they are further west where conditions of sheep-farming are somewhat different.

In view of Andrew's reference to the Border country, it is worth drawing attention to Chapter XXIX, "Sea Gulls Inland", of Abel Chapman's *The Borders and Beyond* (1924), which deals with the moorland on the English side; on page 392 it is stated that adults are regular winter visitors and that "adolescents frequent the hill country at all seasons". Stranded salmon and braxy are shown to be favourite foods. JAMES W. CAMPBELL

Breeding of Great Black-backed Gull in Gloucestershire.—On 3rd July 1955, a pair of Great Black-backed Gulls (*Larus marinus*) was found breeding on Chapel Rock at the mouth of the River Wye, Gloucestershire. Whilst the nest containing a single egg was being examined, the two adults demonstrated overhead and later, after we had left the rock, one of them settled in the vicinity of the nest. We are informed by Mr. H. H. Davis that this is the first breeding record for the county.

D. M. CORMACK, R. S. CORMACK and R. H. POULDING

Redwing alighting on the sea.—On 23rd October 1955, at North Gare Breakwater, Teesmouth, Co. Durham, a Redwing (*Turdus musicus*) was seen approaching from the north-east, flying about 2 feet above the sea. Some 20 yards short of the breakwater the bird tumbled in the air and alighted on the water. It floated on the heavy swell with tail cocked and bill pointing upwards at about 30°. The wings were drooped but not spread. After resting on the sea for some 30 seconds, it took off without difficulty and reached the breakwater. P. J. STEAD

[Some observations by R. K. Murton on Passerines alighting on the sea were published in *British Birds,* vol. xlviii, pp. 419-420.—EDS.]

Albinism related to age.—On 24th November 1950, an adult male Blackbird (*Turdus merula*) was trapped and ringed at Cleveleys, Lancashire. It was trapped and released at the same place on the following dates: 20th March 1951, 28th April 1951, 9th June 1952 and 1st July 1954. When the bird was handled on each of these occasions, its plumage was quite normal and had no distinguishing features. During the months of September and October 1955, an adult male Blackbird was seen in the area, undergoing what appeared to be an excessive moult. It had a very bedraggled appearance, the head was completely devoid of feathers and there were flecks of white over most of the plumage. It was wearing a ring and, after many unsuccessful attempts, it was eventually trapped on 4th December 1955 when it was found to be the bird first ringed on 24th November 1950. The moult was then complete and there were considerable patches of white over most of its plumage, particularly the head. As this bird was adult when first ringed in November 1950, it was at least four years old when retrapped in July 1954 and at that time had no traces of albinism. At the time of its moult in September 1955, it was at least five years old. There do not appear to be any records suggesting that albinism is a characteristic of age although W. T. C. Rankin (*antea*, vol. xlvii, pp. 406) reported an increase in the amount of white on a male Blackbird from one year to the next. On the other hand, there is a record (H. Bettman, *Orn Mitt.* (1953) vol. 5, pp. 154) of a decrease in the amount of white on a Blackbird in successive moults. R. M. BAND

Robin taking dragonfly.—With reference to Mr. Bryan L. Sage's note on a Robin (*Erithacus rubecula*) feeding on small damsel-flies (*antea*, vol. xlviii, pp. 459), I wish to record that on 22nd July 1950, at Hill Head, Fareham, Hampshire, I saw a Robin chase and eat a dragonfly of the species *Sympetrum striolatum* after stripping off its wings. In the same area I also watched a Whitethroat (*Sylvia communis*) catch another dragonfly of the same species, a fact that has already been recorded (*antea*, vol. xlv, pp. 77). C. SUFFERN

Abnormal song of Willow Warbler.—On 26th May 1955, near Dartford, Kent, I heard what I first took to be an abnormal Linnet (*Carduelis cannabina*) song. However, the singer turned out to be a Willow Warbler (*Phylloscopus trochilus*). I listened at close quarters to over a dozen more songs, which were all similar. The form of the song was of Willow Warbler pattern, and the first three notes of fairly normal Willow Warbler type, but in the remainder of the song the typical plaintive sweetness was replaced by a strikingly Linnet-like quality. The song of this species has not been critically investigated, so that we can as yet say nothing as to the possibility of this variation being a learned one.

JULIAN HUXLEY

Serin in Sussex.—Shortly after 9.30 a.m. on 2nd November 1954, I saw a Serin (*Serinus canarius serinus*) on rough ground at the end of Langney Point, Sussex. For some ten minutes I had excellent views of it at very close range while it fed on the ground with other small birds, perched on wires or flew around. It was a very small finch, smaller even than the Goldfinches (*Carduelis carduelis*) with which it fed. Perched in silhouette the most striking features were the short, thick bill and the rather domed forehead and crown. The tail was short and slightly forked. The upper-parts were brownish, heavily streaked a darker colour. The under-parts were less heavily streaked and had a yellowish tinge. There was some greenish-yellow at the sides of the head. In flight it showed a striking yellow rump but no yellow at the sides of the tail. Its flight was very rapid and its flight call was a long twitter which I noted as something like " perilouee." When firing began on the neighbouring rifle range it, together with most of the other small birds present, flew off inland and was not seen again. The wind was northerly at the time but it had been south-easterly during the night and there had been fog which had just lifted. D. D. HARBER

"Anting" by House Sparrow.—At 2.40 p.m. on 16th August 1955 — a fine and warm afternoon — I watched a male House Sparrow (*Passer domesticus*) sitting on the pavement at Moor-lane, Plymouth, Devon. The bird was picking up ants, then rubbing them under its wings and tail with its beak.

A. M. COMMON

[We know of no previous published record of "anting" by a House Sparrow. The habit, however, has been noted in such closely-related species as certain of the weaver-birds (*Ploceidae*). —EDS.].

REVIEWS

BIRDS FIGHTING (Experimental studies of the aggressive display of some birds). By STUART SMITH and ERIC HOSKING; with field assistance by GEORGE EDWARDS. (*Faber and Faber*, London, 1955). 128 pages; 32 plates. 18s.

Birds Fighting is one of the first bird books to be illustrated mainly with electronic flash photographs. A number of them have already appeared in this and other journals. They depict with great clarity the postures of aggressive birds when stimulated to action with stuffed models and are of the very high standard we have come to expect from Eric Hosking. While "slow-motion" films of birds in motion are usually satisfying aesthetically, the high-speed photograph, registering as it does much that the eye does not perceive, often seems to give an unnatural effect by "freezing" motion. This effect is increased by the absence, from many of the photographs, of background detail. But it is as scientific records that these pictures should be judged and from this point of view they are admirable, though in some instances the sequence of activities in which these postures were assumed might have been more apparent if a few frames from the cinematograph films had also been reproduced.

Although the author of the text modestly remarks that he and his colleagues "have scarcely scratched the suface of our subject" they have turned up a great deal of interest and it is to the book's credit that it suggests many topics deserving further research. In particular the experiments made with a stuffed Cuckoo at the nests of a number of Passerines indicate that this technique might be developed further into a comparative study which should throw light on the history of nest-parasitism and the evolution of correlated adaptations by species victimized. For example, the author contrasts the vigorous reactions of the Willow Warbler with the "negative attitude" of the Hedge Sparrow and suggests that the passive behaviour of the latter has rendered unnecessary the evolution of blue-egg laying "Hedge Sparrow" Cuckoos. But may not these two maladaptations indicate rather that in this country the victimization of the Hedge Sparrow, at least on the present scale, is comparatively recent? Among other interesting observations recorded are instances of Passerines becoming regardless of man in their excitement when the Cuckoo model was shown. The principle involved may be of some importance.

The term "imprinting" is employed when, apparently, the perception and retention of a visual image is meant. It would be regrettable if this usage were to be adopted, as "imprinting" already has a different connotation in ethological literature. Heinroth used "Prägung" of fixations which occurred very early in the life of young birds and the translation of this term has been accepted as descriptive of these phenomena by writers in English.

The conclusions reached and summarised in the last chapter are for the most part confirmatory of previous work rather than novel and some of the generalizations go beyond the observations described. E.A.A.

THE PASSENGER PIGEON: ITS NATURAL HISTORY AND EXTINCTION. By A. W. SCHORGER. (*The University of Wisconsin Press,* Madison, 1955). 424 pages; 5 tables; 22 figures. $7·50.

THE first human observer to record the Passenger Pigeon was Jacques Cartier, who saw a vast flock at Cape Orleans on Prince Edward Island, on 1st July 1534. The last *wild* pigeon of this species, according to its latest historian—the author of this scholarly and excellent book—was probably taken in Pike County, Ohio, on 24th March 1900. The last survivor was a female, which probably died at 1 p.m. on 1st September 1914, in the Cincinnati Zoo, an adult female which may have been nearly thirty years of age.

For a few centuries after it was first seen by white men, the Passenger Pigeon was not only the most numerous bird on the North American continent, but quite possibly accounted for between a quarter and a third—possibly even a greater proportion—of the total North American bird population. It seems quite possible that in its heyday its population was of the order of three thousand million individuals.

A. W. Schorger's notable study is primarily devoted to establishing from the literature all that is known about the life history of *Ectopistes migratorius,* its behaviour, anatomy, reproduction and migration, and to a special study of the last century of its existence on earth. To this study he has brought all the discipline and scholarship required of the modern ornithological historian, who has to go far beyond the orthodox literature of ornithology to complete his mosaic. Schorger's excellent bibliography shows the extent of his enthusiastic excavation of the written word, in magazine, journal, newspaper, book. If his end product has become a little disjointed, we cannot blame his scholarship—only the extraordinary complexity of his subject.

The fluctuations in the annual crop of fruits on the deciduous trees of the United States seem to have created a vast inter-state traffic of the herds and droves of these pigeons that darkened the sky. In one year the great nesting might be in New York State, in the next in Pennsylvania, in the next Wisconsin; later in Indiana, then in Michigan and Ontario, then in Minnesota, then perhaps in Pennsylvania and Minnesota, then for some years in Michigan again, and then back to New York State or Pennsylvania. There was not, of course, just one great flock, but several that moved about the north-eastern States. In some years, within a quarter-century of the bird's ultimate extinction, four or more great nestings took place at widely separated points. The collapse began to be noticeable in the 1870's and was, on the whole, a smooth one, in the statistical sense; and had crossed the mysterious point of no return that threatens the numbers of so many social species, before anybody had had time to be seriously sorry for the victim. Public opinion had prompted a certain amount of legislation in a few States, it is true, before the last wild Passenger Pigeon was dead, but it was far, far too late. The Passenger Pigeons were destroyed, quite simply, by commercial-minded humans determined to market cheap food at a profit—destroyed as much by the sacking of breeding-grounds as by direct slaughter. Only a secondary contributory factor was the reduction in the area of woodland that provided the Passenger Pigeon's staple food, namely beech-mast and acorns.

The Passenger Pigeon laid normally but one egg, which it incubated in the short period of thirteen days. It laid replacements, after failure, and occasionally appears to have had a true second brood, though this seems to have been rare. It is doubtful whether the great packs ever nested twice in the same year in widely separated places, as had been often supposed. So strongly were the great nestings tuned to the availability of mast that Schorger thinks that only a *small* part of the total population was ever involved in a second nesting.

Schorger's book is an account which will be of great interest to ecologists as well as pure ornithologists. It is a lesson from our own times of the biological danger of successful specialization. Doubtless the author never intended this study for light reading, and his careful and balanced conclusions have often to be disinterred from a welter of facts. In the nineteenth century man brought about, by his blind greed, the greatest cataclysm ever to have overtaken a wild bird species. Mr. Schorger could have chosen to make a sensational and dramatic story of this cataclsym. Instead, he has given us a masterpiece of detailed and severe documentation, a definitive file of information. Readers of this excellent book will not take it all in at a sitting, but must inevitably conclude that the story of the Passenger Pigeon has been presented in the right way, with all the facts and no frills. JAMES FISHER

A HAND LIST OF THE BIRDS OF RADNORSHIRE. By Geoffrey C. S. Ingram and H. Morrey Salmon, C.B.E., M.C. (Published by *Herefordshire Ornithological Club* from Wyche House, Kington, Herefordshire, 1955). 42 pages.

The authors started collecting material for this concise and authoritative *Hand List* over 30 years ago, while to make it as up-to-date as possible they have revisited almost every part of the county within the past years, in addition to receiving much help from other observers. An outline of the county's ornithological history is given, and its topography is described. Painstaking research has been required to unravel the county records from old publications which did not respect county boundaries.

The list includes 172 species and 4 subspecies which are grouped: breeding residents, 74; breeding summer-visitors, 24; regular visitors and passage-migrants, 15; occasional visitors, vagrants, etc., 63. This is a small total compared with S. Wales counties and Herefordshire, attributable no doubt in part to the present scarcity of resident ornithologists, and to the lack of a County Report before 1951. For the same reasons a high proportion of the records are more than 20 years old. Perhaps as a result of thus not being unbalanced by a mass of recent notes, the changes during the past quarter or half century stand out unusually clearly, with a depressingly long list of decreases. These include Sparrowhawk, Kite, Hen Harrier, Peregrine, Merlin, Red Grouse, Black Grouse, Partridge, Corncrake, Lapwing, Golden Plover, Common Sandpiper, Dunlin (not bred in recent years), Lesser Black-backed Gull, Stock Dove, Turtle Dove, Little Owl, Long-eared Owl, Nightjar, Woodlark, Jay, Ring Ouzel, Wheatear, Stonechat and Red-backed Shrike.

On the other hand Buzzard, Green Woodpecker (apparently), Raven, Goldcrest and Goldfinch have increased. Both Buzzards and Ravens have abandoned nearly all their former crag breeding-sites, and now nest in trees. During the past 30 years Curlews as breeding birds have here, as in other parts of the country, been moving down from the hill tops to fields at intermediate and lower levels; they are only rather thinly scattered now on the higher moorlands.

A great deal of information has been collected and admirably condensed into a small compass here. Each species is allotted one or two paragraphs, stating seasonal status and strength, often with an indication of altitude limitations, and where of value details of dates and localities have been given. P. A. D. H.

LETTERS

CYANISTIC EGG OF CURLEW

SIRS,—There is surely nothing very remarkable about the finding by Messrs. W. G. Hale and G. Webster of a single cyanic type egg of the Curlew (*Numenius arquata*), on a Lancashire moor on 7th May 1955 (*antea,* vol. xlviii, p. 455). Cyanic eggs are normally prematures lacking their final pigmentation. A premature can surely often be laid outside a nest-scrape, in the case of a wader. On 6th June 1936, in company with Mr. Gerald Tomkinson, I found in Finmark the nest of a Whimbrel (*N. phaeopus*) containing four part-incubated eggs of which three were typically coloured and marked, and one was cyanic. True, there were a few inconspicuous brown specks, but these do not detract from the generally blue appearance of the egg that is now in my collection. Complete *clutches* of cyanic type eggs are definitely rare, but singletons are another matter. W. M. CONGREVE

SIGHT RECOVERIES OF COLOUR-RINGED SNOW BUNTINGS

SIRS,—To date, 7th March 1956, 433 Snow Buntings (*Plectrophenax nivalis*) have been ringed at the Spurn Bird Observatory, Yorkshire, since the end of December 1955. Of these, 292 are carrying a red coloured ring in addition to the B.T.O. aluminium ring. I should be grateful if anyone who sees one of these birds carrying a red ring would write with details to me at 144, Gillshill Road, Hull. GEORGE H. AINSWORTH

BLACK TERN MIGRATION ON 9th MAY 1954

SIRS,—I read with great interest Mr. R. F. Dickens' excellent paper "The passage of Black Terns through Great Britain in spring 1954" (*antea,* vol. xlviii, pp. 148-169), and in particular his deduction that the migration of Black Terns (*Chlidonias niger*) in the period 7th-10th May 1954 took place in two phases, a deflection well to the west of the normal routes, followed by a re-orientation to the east or north-east across Britain, mainly on 9th May. Indeed it is only because of the comprehensive nature of the paper, which might otherwise be taken as the last word on Black Tern immigrations, that I venture to challenge his further conclusion (pp. 156, illustrated in Map 2, pp. 158) that the birds approach Great Britain from the S.W. after a sea-crossing from the Bay of Biscay. In my opinion the facts he quotes favour better the hypothesis of an overland flight into south and south-west England from the south and south-east, with the movement originating in mid-France.

Mr. Dickens gives no clear reason for his deduction of an approach from the south-west except for the concentration in the Bristol Channel and the weather conditions in France, both of which are ambiguous: the principal drawback of his theory is that it gives no suggestion as to why the birds were disorientated, or why they re-orientated themselves at the time and place that they did. If his hypothesis is correct, the birds must have re-orientated themselves in the Irish Sea and Bristol Channel areas—not further south—in order to account for the small number of records on the Channel coast. However, the birds seen in the Cambridge area passed between 0630 and 0930 B.S.T., while birds were still leaving the Bristol Channel at 1315 hours (pp. 153), so that this re-orientation must have taken place partly during the night and partly during the day. Similarly, Mr. Dickens suggests that the disorientated flight from the Bay of Biscay took place both by day and by night on 8th and 9th May. The weather conditions were not markedly dissimilar in the two phases of the migration—in particular the wind remained easterly throughout—and hence this theory leaves the cause and remedy of the disorientation a mystery.

These can be explained, however, if the arbitary hypothesis of an oversea approach to Britain is abandoned. Mr. Dickens demonstrates the connection between the westward deflection and the prevalence of easterly winds. The deviation is not referable to "drift" in its restricted sense of a downwind orientation, but the circumstances are sufficiently similar to suggest, by analogy with theories of drift migration, that the birds were deflected by the wind at night, and re-orientated themselves at dawn, when able to assess their flight by visual means.

At dawn on 9th May the birds must have been dispersed over an area bounded roughly by London, the Scilly Isles and Manchester. On the hypothesis given above, this indicates an overland migration from mid-France, the concentration in the west of England suggesting that the main direction of flight was N.W., presumably related to the east and south-east winds prevailing in France and southern England during the night. The paucity of records for the Channel coast of England can be explained by supposing that the southernmost birds had already crossed this coast before dawn.

This alternative interpretation of the records is not only successful in accounting for the timing of the two phases of the migration: it is also more in accord with Mr. Dickens' account of the migration routes of the species through Europe in that it does not presuppose an earlier deflection westwards to the Biscay coast. The relation of Black Tern immigrations in other years to easterly winds in the Biscay area (pp. 160-161) supports this interpretation equally, since these winds (as in 1954) are normally associated with easterly winds in mid- and north France. I. C. T. NISBET

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BRITISH BIRDS

QUAIL IN THE BRITISH ISLES, 1950-53

By R. E. Moreau

(*Edward Grey Institute of Field Ornithology, Oxford*)

When it appeared that 1953 was a good year for Quail (*Coturnix coturnix*), the Editors of *British Birds* decided that it would be useful for the survey that had been made up to 1949 (*antea,* vol. xliv, pp. 257-276) to be continued to 1953 and they therefore asked (*antea,* vol. xlvi, p. 307) that unpublished records from 1950 onwards should be sent to them. Thanks are due to all those who were good enough to respond, as well as to those who have supplied me with information direct. All the relevant papers are filed in the Edward Grey Institute.

In making the survey up till 1949, to which I attempted to give some quantitative form from 1930 onwards, comparison between years was hampered by the fact that the number of counties covered by formal reports varied considerably and the amount of observer-time and general ornithological awareness in the British Isles certainly differed in pre-war, war and post-war years. Hence only the crudest basis of comparative abundance could be adopted—for England, the proportion of "reporting" counties in each year that recorded (a) any Quail at all, (b) more than 2 Quail. On that basis it was concluded that the general trend of the British Quail population had been upwards from about 1942 and that in 1947 the species was probably at least twice as plentiful as in any other year in the first half of the twentieth century.

Unlike the earlier years, those from 1947 onwards are comparable with each other (with the proviso that there has probably been a progressive increase in the observer-time), and therefore the records for each year can be collated on a more strictly quantitative basis, as in Table I. It is not necessary to stress that these figures have still only a comparative, no absolute, validity; but it may be worth while to point out the difficulties inseparable from recording the occurrence of this species and evaluating the records received. Quail are heard far more often than they are seen, and in any one place, e.g. in or about the same field, however consistently observed, calling is often heard only at long intervals. Consequently it is difficult to know whether the bird concerned is present there all the time or in the silent interval has moved so far as to be recorded somewhere else. I have seen Quail that have been put up make direct flights of 300 and 400 yards.

Quail whose habitat is destroyed by mowing or harvesting must of course move and this may account for an outburst of calling such as that recorded from at least 4 Quail on the Lickey Hills, Worcestershire, 9th-13th August 1953. Longer displacements are not unlikely. As noted before (*antea,* vol. xliv, pp. 272), in parts of France Quail come and go in the course of the summer, depending on the state of the vegetation. In Hungary two ringed Quail were found to have shifted 16 km. between 27th June and 4th July and 40 km. between 6th and 13th July (*Aquila,* 1929/30, pp. 140, a reference that I owe to Mr. F. Haverschmidt). Something of the kind in Britain could lead to the same birds being "recorded" in more than one locality (or county) and may help to account for the fact that in some places and in some years Quail are not heard before July or even later, and clutches are found as late as September*. However, the doubts and errors arising from such causes apply to all years and hence do not affect the validity of the comparisons in the Table.

On the other hand, the prevalence of calling, which in Britain is inevitably the index of the Quail's abundance, may be influenced by the proportion of the sexes present. It is probably true that mated males call a great deal less than unmated ones, and it appears from Italian experience—A. Duse *et al., Ric. Zool. Appl. Caccia,* no. 9 (1935)—that males predominate in the early stages of the spring migration and females in the later. Since the British Isles are on the edge of the Quail's range, the number arriving each year is likely to fluctuate more here than further south and to depend much on the weather at different stages of the spring. In the Mediterranean countries, where Quail migrations have been most observed, the records of them are still difficult to rationalize (Moreau, *Ibis,* vol. 95 (1953), p. 350; *Ardeola,* vol. 1 (1954), p. 97), but it is evident that in any one spring the weather might favour the influx of Quail into Britain early, with males predominating, but not later, when the numbers of the sexes might be equalized. Such conditions might well produce a greater volume of calling during one British summer than during another when in fact more males were present but they were not short of mates.

Finally, there is the problem of the arithmetical value to be given to the records as usually forthcoming. I have consistently taken the lowest. Thus, each locality for which Quail are cited is counted as one bird, unless there is an unequivocal statement to the contrary. Broods and bevies (which may or may not consist of one or more grown-up broods) are treated collectively in the tabulation. (Where the number in a brood or bevy is recorded it does not as a rule exceed 8, though there is one of 20 in Wiltshire in 1951.) Another indefinite category in the records is "several" or "many", applied either to the Quail in one locality or to the localities in which Quail have been heard in some particular year and county. Each of these cases has for the present purpose been treated as a "several". Finally, clutches almost without exception relate to cut-out nests and so are mere losses.

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* Some of these might be laid by birds of the year. In captivity Quail have been found to lay at the age of 40-50 days (N. Kuroda *cit.* W. Meise, *Vogelwarte,* vol. xvii (1954), p. 212). Meise also discusses late (summer) movements of Quail in central Europe, which he regards as due to unfavourable local conditions.

TABLE I—QUAIL (*C. coturnix*) IN ENGLAND, 1947-1953

	No. of individual records	No. of broods and bevies	No. of clutches	No. of cases of "several"
1947	111	11	12	6
1948	74	3	6	3
1949	56	7	3	4
1950	53	4	—	—
1951	36	4	1	—
1952	142	11	6	1
1953	311	22	10	6

Subject to the foregoing caveats, Table I suggests that from 1947, the best of the century up till then, there was a steady decline until 1951, to something like one fifth of the 1947 population. But both 1952 and 1953 were excellent years, the former probably about equal to 1947, and 1953 twice as good. It may be added that the partial information already available for 1954 makes it certain that there was then a slump, to probably about a fifth of the high 1953 population (and from my own experience I should say that the slump continued into 1955). But the 1954 population was better than that in 1950 and 1951, for the published records from 13 counties available for 1954 total 50 and 1 bevy.

In discussing the results of my previous survey I suggested (*antea,* vol. xliv, p. 261) that *a priori* the appearance of an abnormally large number of Quail in Britain might well be favoured by abnormally dry and/or warm spring weather in France, while a high prevalence of southerly and easterly winds would help the Quail to overshoot their usual European breeding grounds. For the outstanding Quail year of 1893 these conditions were found to be in part satisfied. I have therefore approached the Meteorological Office for information about what appear to be the three best Quail years of the present century, namely 1947, 1952 and 1953. For the first of these the charts available make it difficult for an opinion to be expressed, but a report kindly provided by the Meteorological Office for the other two years shows that the postulated conditions seem to have obtained to a significant extent in 1952, though perhaps not in the even better Quail year of 1953. In 1952 temperaturures were above normal in France throughout April and May (by as much as 5° C. in some places in April) and winds from directions between south and east were continuous until the third week in May. But rainfall was not much less than normal. On the other hand in 1953 France was abnormally wet in

April except in the south, but most of the country was decidedly dry in May. Temperatures in both months were a little above normal (1°-2° C.), but the winds were rather unfavourable. Until the beginning of May directions between west and south predominated. Then for a few days northerlies alternated with southerlies and became established in the third week in May. Thus 1952 was warmer than 1953 and also had the "right" winds, while the only really favourable feature of the 1953 weather seems to have been the dryness of parts of France. I conclude that the apparent greater abundance of Quail in Britain in 1953 than in any previous year is not readily explicable by the spring weather on the neighbouring part of the Continent, over which the birds are presumed to come.

Turning now to distribution in England, the only counties for which I have found no Quail recorded in 1953 are Middlesex, Monmouth, Rutland and Westmorland, all of which are from their situation and/or small size particularly unlikely to produce Quail. In several counties Quail were recorded in every one of the four years 1950-1953, namely, Berks., Cambs., Hants., Oxon., Wilts., Yorks. and, in smaller numbers than the preceding, Beds., Dorset and Norfolk. From this list two of the counties with the best showing 1940-1949 are absent, namely Gloucester and Cornwall. Counties for which Quail have been reported in three of the four years are Cornwall, Cumberland, Glos., Herts., Kent, Leicester, Northants, Northumberland, Somerset, Suffolk, Sussex, Warwicks. and Worcs., the circumstances and numbers varying widely, however, between these counties. Kent is a county that, with its new "Bird Report" starting in 1952, is at last making the excellent showing of Quail that is to be expected from its geographical situation and ecology.

As concluded in my 1951 review, Quail in England are most numerous in calcareous cornland at no great altitude and modern grass-cutting practice certainly makes it more and more advantageous for them to make their initial nesting attempt each year in corn. But they are of course by no means so ecologically limited and there are now records at 1000 ft. above sea level in West Shropshire and near Accrington, Lancashire. Alongside these general considerations the local distribution of Quail in England seems, in the light of present records, to be determined partly by two factors, a persistent choice of some restricted localities and a one-year breeding aggregation in others. Examples of the former type, at least in the period under review, seem to be the Blewbury area of the Berkshire Downs, certain parts of the western foothills of the Chilterns south of Watlington, Melbourn and Newmarket in Cambridgeshire, Mildenhall in Suffolk, Wellingbourne in Warwickshire, Aldbourne and Downton in Wiltshire.

Examples of the second type are: the five or more birds calling (and breeding proved) on a farm at Cholsey, Berkshire, in 1951, the first record there in living memory; the estimated 6 (breeding proved) in a 45-acre field at Kirtlington, Oxfordshire, in 1953; the 4 on 1,000 acres and many on surrounding farms at Boyton, Cornwall, in 1953; and at least 3 males calling in the somewhat unlikely Accrington locality. In such cases as these, it seems that a tendency to nest in association must be operating and that a calling male may attract later immigrants to his vicinity, even in a year when the total Quail population appears to be low (1951).

The wide distribution of Quail in the British Isles in recent years is emphasised by the prevalence of records from the more westerly and northerly localities. The number of insular records is astonishing, even in view of the greater attention that ornithologists have been paying to islands. The Isle of Man is in a class by itself, with records in each of the four years, numerous in both 1952 and 1953. Elsewhere we have: Lundy, 1953; Skokholm, 1950, 1951, 1952; Grassholm, 1950; Skomer, 1953; Bardsey, 1952; Anglesey, 1951, 1953; Great Saltee, 1952; Foula, 1953; Mainland (Shetland), 1952 (several); Fetlar, 1952; Unst, 1952 (1 + c/11), 1953 (at least 6 heard 5th-11th June); Orkney, 1951, 1953; Fair Isle, 1952 ("at least two pairs summered"); Isle of May, 1952.

The records for the Scottish mainland include only Sutherland, 1950, 1953 (2); Angus, 1952 (c/8); W. Lothian, 1952; E. Lothian, 1953; Berwick, 1952; Ayrshire, 1952. This impression of scarcity in Scotland may be illusory, for the total is less than that for the northern isles alone.

Wales, which had in the past so few Quail, shared in the 1953 influx—Radnor, Denbigh, Glamorgan, Caernarvon, as well as Anglesey, but, surprisingly, not Pembrokeshire. (There was also a Merioneth record in 1952 and one for Cardigan in 1951.) The 1953 influx extended also to Ireland (Dublin, Waterford, and Galway).

During the four years there are a few records of wintering birds in November and December (Ayrshire, 1952; Suffolk, 1951; Worcestershire, 1950); in January (Waterford, 1953); in February and March (apparently one bird) in Worcestershire (1950); and in March in Hampshire (1950). The April records from Cambridge (1951), Hampshire (two, 11th April 1950) and Kent (20th April 1953) may some of them be due to birds that had wintered, but this can hardly apply to the one on Great Saltee on 29th April 1952.

Records in May are few in England before the last week, but 1953 produced a bird in Oxfordshire on the 4th, in Cambridgeshire on the 6th, in Hereford on the 9th and in Kent on the 19th, while c/11 found in Kent on the 28th points to Quail being present there by about the 15th at latest. Thus 1953 was perhaps a year of exceptionally early Quail immigration, but the greater abundance of such early records then may simply be a consequence of the larger total number reaching the British Isles.

It is a curious fact that over the four years as a whole the proportion of exceptionally early records is much higher in the more remote stations than in England—in 1950 on 1st May on Skokholm and 12th May on Grassholm; in 1952 on 29th April on Great Saltee and on 20th May on the Isle of May; in 1953 on 20th May on Skomer and 23rd May in Caernarvon. It seems most unlikely that Quail would regularly reach these far western and northern points before they reach England; and the fact that they are not consistently detected earlier in England might suggest the they do not as a rule start calling as soon as they arrive.

Since I wrote my previous review no important addition has been made to our knowledge of the life-history of the Quail. In England, only some particulars of the calling-habits have been published (*Brit. Birds,* vol. xlv, pp. 167-170; *Oxf. Orn. Soc. Report,* 1952, pp. 17-19). One remarkable observation at Cumbernauld, Lanarkshire, briefly recorded by Mr. Leslie Stephen in *Glasgow Bird Bull.*, vol. ii, p. 17, and amplified by him *in litt.,* deserves special mention. On 22nd July 1949 a Quail began to call close to his farm and was heard for about four weeks. Both its appearance at close quarters and its characteristic call indicated that it was a male. A week after it was first heard the bird began to "shadow" a brood of 8-day-old Partridge (*Perdix perdix*) chicks that had been hatched by a Rhode Island Red in the stackyard, and when the cheepers strayed he tried to gather them, clucking like a Partridge, but more gutturally. On one such occasion, while he was actually squatting in a brooding posture, with wings out and breast feathers lifted while he clucked, the hen attacked him and pulled feathers out of his crown, leaving a bare spot. Thereafter the Quail did not venture again into the stackyard but was repeatedly heard and seen close by, calling the typical "wet-my-lips", often preceded by the growling "mia ouan". This observation is of general interest in two ways. First, it is at variance with the general impression from the literature that the male Quail pays little attention to his brood. Second, it shows that, as suspected from field-experience, the "mia ouan" notes are not necessarily uttered only in the presence of a female*.

There is no doubt that the best means of advancing knowledge about this most elusive bird, especially its true local status in relation to the amount of calling heard, would be effective use of the quail-pipe. I may say that I have taken repeated lessons from Spanish practitioners, but have had practically no response from Quail in this country.

SUMMARY

1. The annual totals of Quail recorded 1950-1953 inclusive have been calculated for comparison with those of the preceding years.

2. Subject to various caveats, it appears that there was a decline from 1947, the previous best year for Quail in this century, to 1951 inclusive, a recovery in 1952, and an increase in 1953 to at least twice the numbers in 1947. This result is not obviously connected with the weather in France in the respective springs.

3. The main features of local distribution in Britain are given. Occurrence of Quail seems to be determined partly by adherence to " traditional " sites and partly by the tendency for several birds to settle within earshot of each other.

4. Throughout the period the number of insular records is remarkable. The 1953 influx extended to Wales and Ireland.

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* S. Pfeifer (*Orn. Mitt.*, vol. vi (1954), p. 163) observed this guttural sound to be uttered in display (of a captive pair), with neck extended upwards to its limit.

DELAYED EMIGRATION OF CERTAIN BIRDS IN AUTUMN 1954

By J. A. G. Barnes

(*Concluded from page* 79)

PART II—PASSAGE-MIGRANTS

Most of the birds included under this heading are waders, and it should be noticed that with some species, formerly regarded normally as passage-migrants, there has been a marked increase over the past twenty years or so in the number of individuals wintering in the British Isles. This tendency has perhaps been most marked in the Ruff (*antea*, vol. xlviii, pp. 367 and 545), but also applies in varying degrees to the Black-tailed Godwit, Green Sandpiper, Greenshank and, more recently, the Spotted Redshank. The mid-winter records given below for these species may thus be regarded as a statement of a stage reached in a continuing process rather than as a list of exceptional occurrences, though there is some indication that for certain species numbers were considerably larger than in previous years. This was certainly the case for the Lesser Black-backed Gull (*Larus fuscus*), which is now recognised as only a partial migrant and is consequently excluded from the systematic list below. The increasing proportion of winter residents in this species was noted in 1949-51 (*antea,* vol. xlv, pp. 3-17), but in 1954-55 the numbers remaining in north Somerset and the London area were quite exceptional (*antea,* vol. xlviii, pp. 368-370), and there was a marked increase also in Norfolk and Morecambe Bay.

Although the early winter of 1954-55 was unusually mild there was a period of severe frost in the middle of January, and nearly the whole of February was very cold, with prolonged snow cover, over most of Britain. It will be noticed in the following summary that many wintering waders were reported in that month.

Of the purely passage-migrant species the Black Tern (*Chlidonias niger*) showed the most conspicuous delay in emigration. In their paper on "The passage of Black Terns through Britain in autumn 1954" (*antea,* vol. xlviii, pp. 300-307) A. Butterfield and K. Williamson note that there were 35 "bird-day" records within the range of Witherby's late dates, and they give particulars of these occurrences which need not be repeated here. Whimbrel, Little Stint and Curlew Sandpiper also show several late dates, though not to a comparable extent.

Whimbrel (*Numenius phaeopus*).—"Exceptionally winter (most often recorded N.W. England and Forth, Scotland). Passage . . . to fourth week September with stragglers to last week October". The following birds were recorded in November: on the 2nd one at Wolferton and two at Snettisham, Norfolk; on the 12th one on Farlington Marshes, Hampshire; on the 21st one at Frampton, Lincolnshire. Stragglers also persisted in Essex until early November. Two wintered on Bardsey Island, North Wales, where there were also two in the winter of 1953-54.

Black-tailed Godwit (*Limosa limosa*).—"Occurs all months, but most frequently as passage migrant . . . Many stay winter (number increasing) especially in west". Three or four were seen during the winter on the Wash and there was an unusual inland occurrence on Cambridge Sewage Farm on 5th December. The following large flocks are noteworthy: 220 on Stour Flats, Essex, on 7th November; 612 in Chichester harbour, Sussex, on 12th December, the maximum count of the year; 600 or more in the Brands Bay area, Dorset, on 27th December. The writer understands, however, that these numbers are by no means unprecedented and that the subject is being discussed in a forthcoming paper by Averil Morley and K. L. H. Price.

Green Sandpiper (*Tringa ochropus*). — "Passage migrant frequent autumn and spring, often stays winter (usually single birds). Emigration . . . to early or mid-November". There is evidence from several districts that wintering Green Sandpipers have been recorded more regularly in recent years. In 1954-55 from one to four birds were reported in the months of December, January or February in one or more localities in the following counties: Devon, Wiltshire, Isle of Wight, Hampshire, Sussex, Kent, Hertfordshire, Berkshire, Cambridgeshire, Gloucestershire, Lincolnshire, Lancashire, Northumberland, Lanarkshire.

Wood Sandpiper (*Tringa glareola*).—"Passage migrant . . . to end September . . . with stragglers to first week October".

16th October: One at Stone Creek, Yorkshire.
25th October: One at North Fambridge, Essex.

Spotted Redshank (*Tringa erythropus*). — "Exceptionally winter . . . Passage migrants . . . to mid-October, occasional to last week November". In recent years Spotted Redshanks have occurred in winter fairly regularly in a few places, but 1954-55 seems to have been exceptional for the number of wintering birds. In addition to a quantity of records in late October and November, the following occurrences were noted in December, January and February. Up to four near Powderham, Devon, through the winter, and ten on 5th and 6th February. Six on Warren Flats, Southampton, on 27th December, three from 14th to 22nd February. One each at Keyhaven and Dibden, Hampshire, 21st and 23rd February. One at Manhood End, Sussex, on 29th January. Single birds on Medway Estuary and Walland Marsh, Kent, in December; one near Whitstable, Kent, from 7th January to end of March. Seven at Reydon, Suffolk, on 26th December. One at Cley, Norfolk, to end of December. One near Dale, Pembrokeshire, on 19th December. Single birds at Freiston, Boston and mouth of River Witham, Lincolnshire, on 19th December. One at Hoylake through January and one elsewhere in Cheshire in February. One on S. Lancashire coast in December; two on Leven Estuary, N. Lancashire, on 1st and 9th January, and one until 19th March. One on River Eden at Great Salkeld, Cumberland, on 11th and 12th December. One at Hamilton, Lanarkshire, from end of October to 3rd December, and again from 10th March.

GREENSHANK (*Tringa nebularia*).—"Fairly often recorded winter (usually single birds) many parts England, Wales and Ireland, as well as in Scotland and especially in O. Hebrides". Between the beginning of December 1954 and the end of February 1955 from one to three Greenshanks were recorded in Kent, Essex, Pembrokeshire, Lancashire, Northumberland and Fife.

LITTLE STINT (*Calidris minuta*). — "Very few winter records. Passage migrants to third week October, with stragglers to mid-November". Single birds were seen in the last week of October or first half of November in Somerset, Lincolnshire, N. Lancashire and on the Firth of Forth.

5th December: One on Walland Marsh, Kent.
11th and 19th December: One on Stone Marsh, Kent; one in same place in January.
24th-27th December: One at Leybourne, near Maidstone, Kent.

CURLEW SANDPIPER (*Calidris testacea*). — "Very few winter records. Passage migrants . . . to mid-October, with stragglers (rare) to mid-November". Six were seen at Warkworth, Northumberland, on 17th October, and five near Lytham, Lancashire, on 3rd November.

17th November: Twelve on the Swale, Kent.
20th November: One in Langstone Harbour, Hampshire.
21st November: One at Holbeach, Lincolnshire; one near Lytham, Lancashire.
28th December: One at Thorney, Sussex.

RUFF (*Philomachus pugnax*).—"Occasional winter . . . Emigration . . . to mid-October, occasionally mid-November". For some years past, wintering Ruffs have been observed regularly in some counties, including Devon, Cambridgeshire, Nottinghamshire and Cheshire; but in the winter of 1954-55 there were occurrences in unusual places or in larger numbers than normal:—A maximum of 15 on Exminster Marsh, Devon, on 22nd January. One at Thorney, Sussex, on 12th December. In the Thames area, one to three on Perry Oaks Sewage Farm, Middlesex, in December, 21 on 21st January and 23 on 6th February; two on Beddington Sewage Farm, Surrey, on 15th January and 20th February; four on Walland Marsh, Kent, on 19th December, five on Stone Marsh, on 13th February; one on Abberton Reservoir, Essex, to 14th December. Four near Buckenham, Norfolk, on 2nd January, *ca.* 25 on Welney Marsh during the winter. Maximum of 31 on Cambridge Sewage Farm on 1st January. Maximum of 18 on Ecton Sewage Farm, Northamptonshire, on 18th December. Five on Mersey marshes, Cheshire, on 23rd January; three or more on

Ribble estuary, Lancashire, in February. Two near Chevington, Northumberland, 26th December, and 3rd January; one at Jarrow Slake, Co. Durham, on 20th and 21st February.

AVOCET (*Recurvirostra avosetta*).—"Has occurred . . . fairly often in winter". Occurrences at all seasons may be expected more frequently now that the Avocet is breeding in numbers in Suffolk, but the following winter records for 1954-55 are worth mentioning. One at Radipole, Dorset, on 24th January. One at Shellness, Kent, on 28th December. One in Brancaster harbour, Norfolk, on 21st November and 30th December. Four at Little Milford, Pembrokeshire, on 29th January.

ARCTIC SKUA (*Stercorarius parasiticus*).—"Most have generally left E. coast water by end October". The following were recorded in November 1954: one in Welland estuary, Lincolnshire, one off Wolferton, Norfolk, and 10-20 on the Swale, Kent, on the 7th; one off Musselburgh, Firth of Forth, on the 12th; one at Spurn Head, Yorkshire, on the 14th.

HOOPOE (*Upupa epops*).—"Passage migrant . . . August to October, chiefly September". Single birds in Isle of Wight and Cumberland in second half of October.

28th October-8th November: One at Cleethorpes, Lincolnshire.
1st November: One immature at Netherton, S. Lancashire.
26th November: One between Epping and North Weald, Essex.

WEATHER NOTES

September 1954: The unsettled weather of the preceding three months continued through September. On nearly every day a substantial part of the country was affected by cyclonic systems moving from the Atlantic and the few intervening ridges of high pressure were weak and transitory. Winds were frequently from a westerly point and reached gale force at intervals in association with the more vigorous depressions. Mean pressure was below the average for the period 1921-50, the deviation from the average at 9h. ranging from -10.4 mb. at Lerwick, in the Shetland Islands, to -2.9 mb. at Plymouth, Devon. Mean temperature differed from the average for the period 1921-50 by -1.5°F. in England and Wales, and -2.2°F. in Scotland.

October 1954: The weather was generally mild and unsettled; on nearly every day a large part of the country was affected by cyclonic systems from the Atlantic and the intervening ridges of high pressure were transitory. Winds from some south-westerly point predominated and reached gale force locally at times. Mean pressure was below the average for the period 1921-50 except in the extreme south-west, the deviation from the average at 9h. ranging from +0.3 mb. at Plymouth to -6.1 mb. at Lerwick. Mean temperature exceeded the average for the period 1921-50 by 3.2°F. over England and Wales, 1.0°F. over Scotland. Apart from the exceptionally mild October of 1921 it was the mildest October in England and Wales since before 1901.

November 1954: Apart from a period of anticyclonic weather from the 14th to the 20th, conditions were mainly unsettled. During the last week intense depressions from the Atlantic passing over or near the British Isles gave widespread gales, severe and prolonged in some areas. Frequent rain during the last ten days caused extensive flooding. Mean pressure was everywhere below the average for the period 1901-30; the deviation at 9h. ranged from -1.2 mb. at Croydon and Felixtowe to -6.8 mb. at Stornoway. Mean temperature differed from the average for the period 1921-50 by +0.9°F. in England and Wales, -0.1°F. in Scotland.

December 1954: During the first half of the month the weather was unsettled with frequent rain. In the second half, conditions in the south were mainly influenced by high pressure to the south and south-west of the British Isles, but unsettled conditions persisted for the most part in the west and north. Mean pressure was below the average almost everywhere; the deviation ranged from -9.7 mb. at Lerwick to +0.8 mb. at Newquay. Mean temperature exceeded the average for the period 1921-50 by 3.7°F. in England and Wales, 1.9°F. in Scotland.

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The following local reports have also been used: *Bristol Bird Report, Lundy Field Society's Report, Bryanston School N.H.S. Report* (Dorset), *Isle of Wight Bird Report, Hastings and East Sussex Naturalist, Middle Thames Naturalist, Lowestoft F.C. Report, Report of Gresham's School N.H.S.* (Norfolk), *Birkenhead School N.H.S. Report* (Cheshire), *The Field Naturalist* (Cumberland, Westmorland, and Lancashire), *Edinburgh Bird Bulletin.*

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SOME PHOTOGRAPHIC STUDIES OF THE PINK-FOOTED GOOSE

Photographed by ARNOLD BENINGTON, NIALL RANKIN and G. K. YEATES

(Plates 9-16)

THE Pink-footed Goose (*Anser brachyrhynchus*) breeds in east Greenland (between 68° and 76° N.), Iceland and Spitsbergen and is generally held to be the westernmost form of the Bean Goose (*Anser arvensis*), of which there are several populations breeding in northern Scandinavia, Russia, Siberia, Novaya Zemlya and probably Franz Josef Land. Certainly it is very closely related to the Bean Geese, although sufficiently different in appearance, voice and habit to be easily distinguished from any of the races of *A. arvensis* under reasonable conditions in the field. Were it, by an extension of breeding range, to overlap any Bean Goose population, it is a matter of speculation whether the two would merge or remain distinct. The chances of its remaining distinct seem good enough to give it a reasonable claim to specific status.

The distinctive features of the Pink-foot are (1) its relatively small, dark brown head, contrasting markedly with the paler brown of the lower neck and breast and the blue grey back and shoulders; (2) the pink legs of adults (all populations of the Bean Goose, save possibly one, have orange legs); (3) its rather short pink and black bill. The extent of the pink colouring on the bill is rather variable. Occasionally the bill is wholly pink, but usually three-fifths or more is black, although no cases of wholly black bills have been reported. All the birds illustrated, being on the breeding-grounds, are in summer plumage which is rather browner and less contrasted than in winter. Birds in their first autumn are also duller and browner than older birds. The whitish feather edges which accentuate the pattern on the scapulars of old birds (shown in all the plates) are much less prominent in young ones and the juvenile feathers are narrower and round-ended instead of the flat square-ended feathers of the adult. This is particularly noticeable on the breast and under-parts. First autumn birds also usually have duller pink legs, sometimes grey-tinted, and at other times more or less orange. Older birds with orange legs occur rarely (with a frequency of 1 in 1,000, or rather less). From mid-winter young birds are not safely distinguishable from adults in the field.

There are two almost independent populations of the Pink-foot. The birds breeding in Greenland and Iceland winter in Britain, while those from Spitsbergen visit Denmark, Germany, the Low Countries and France. The independence of the two groups has been demonstrated by large scale ringing by the Wildfowl Trust in Iceland (over 10,000 ringed) and Britain (over 6,800 caught) and the ringing of 500 in Spitsbergen in 1952 and 1954 by parties from Cambridge University and Sherborne School. The continental population is of the order of 5,000 in most autumns, the British population eight to ten times larger.

Recoveries and recaptures of ringed birds have shown that the British population can be divided into a number of smaller groups varying considerably in the extent to which they may mix, but none apparently isolated. In England most Pink-feet occur in the Humber and Wash areas and in Lancashire. There are only a few small regularly occurring groups elswhere in England and Wales, apart from those at the east end of the Solway Firth, where large numbers occur divided between Cumberland and Dumfries-shire. Other Scottish strongholds are in the south-east, Fife, Perth, Angus and Aberdeen, while the Moray region is visited rather less consistently by large numbers mainly in the late spring. Until recently the Pink-foot was scarcely known in Ireland, but in the last few years individuals and small parties have been reported from widely scattered localities, though their status is probably still that of vagrants.

The nest-sites shown in the photographs are typical of those used in most breeding areas, though in a few, notably Thjorsarver in Central Iceland, sites much more accessible to foxes and men are occupied. All these sites are on dry well-drained parts of the tundra marshes, often, but not invariably, close to water. The essential criteria for a nest-site appear to be a reasonable view for the sitting goose and a look-out point for the gander within five yards of the nest. Sites are often used year after year.

In Iceland egg-laying begins in the second week of May and, unless checked by cold weather, the majority of clutches are completed before the end of May. In Spitsbergen the first eggs are not laid until early June and laying is largely concentrated in the second week of June. The incubation-period is twenty-eight days, or a little less, and goslings can fly at about eight weeks. Thus in Iceland the first goslings fly quite early in August, while in Spitsbergen few can fly before September. Information on nesting in Greenland is less extensive, but it appears that the times of laying and fledging there resemble those in Spitsbergen.

The Pink-foot can be described as colonial, although most groups of nests are small and their density is never comparable with those attained by many other species of geese. The Thjorsarver oasis, of forty-four square miles, is estimated to have contained about 2,300 nests in 1951 and probably rather more in 1953, when about 8,200 adults including unknown proportions of non-breeders and "failed breeders" were present in mid-July. This is much larger than any other known colony. No group of more than 200 nests has yet been found elsewhere, nor is one likely to be found in Spitsbergen or in other parts of Iceland. But the Greenland breeding-places may include some large colonies, for those so far discovered fall short of the probable total population. At least two British expeditions to those parts of the Greenland coast frequented by the Pink-foot are being made in 1956, so that fresh discoveries are likely. PETER SCOTT

THE ANNUAL MORTALITY OF THE BLUE TIT IN DIFFERENT PARTS OF ITS RANGE

By D. W. Snow

(*Edward Grey Institute of Field Ornithology, Oxford*)

METHODS

First-year Blue Tits (*Parus caeruleus*) can be distinguished from older birds by inspection of their wing-coverts. In first-year birds the bastard wing and primary coverts, and sometimes one or more outer secondary coverts, are dull greenish blue, contrasting with the brighter blue of the rest of the wing-coverts, whereas in older birds all the wing-coverts are the same colour (Drost, 1951). The same age distinction can in principle be made in many other Passerines which have a similar moult from juvenile to first-winter plumage, but in most other British species the difference is not so clear. For instance, in the Great Tit (*Parus major*) Kluijver (1939) found that a proportion of young males cannot be distinguished from older males. In the Blue Tit, thanks to the pure blue of the adult wing-coverts and duller blue and yellow suffusion of the young, the method is reliable. It should be stressed that the comparison is not simply between feathers of slightly different colour, but between feathers of different age: the greenish blue (juvenile) coverts are nearly always more worn than the more recently acquired blue coverts. There are also other less clearcut differences between first-year and older birds, in the general brightness of the plumage and shape and wear of the remiges and rectrices.

In the course of a systematic study of the Blue Tit, the age of over 1000 specimens from all parts of the range was noted by this method. The results give information on the expectation of life of Blue Tits in different parts of the range, and on its relation to reproductive rate.

It would not be legitimate to use museum specimens for a study of this kind if they were a seriously biased sample of the populations from which they were drawn. There are in fact two possible sources of bias which need consideration. First, young birds may show differences in behaviour which make them more or less likely to be shot than older birds. This may well be so in their first few weeks of life; but it seems unlikely that, in such short-lived birds, any such differences in wariness will last for long, and certainly not until the next breeding-season. Birds shot in the breeding-season should therefore be a reasonably unbiased sample of the breeding-population, and it is largely with these that this paper is concerned. The second possible source of bias depends on the fact that the plumage often becomes very worn by April or May, and most worn in first-year birds, which have had their wing- and tail-feathers several weeks longer than older birds. Because of this, collectors might reject some of the first-year birds as not worth preserving. But this is probably not an important source of bias: most collectors collect breeding birds sparingly, and consequently value every specimen that they shoot, rejecting only those that are too badly damaged by shot. In the case of largely sedentary species, like the Blue Tit, collectors wanting good material for subspecific comparison usually take their specimens in autumn or early winter, when neither old nor young are badly worn.

AGE GROUPS IN THE BRITISH POPULATION

Table I shows the numbers of old and young birds collected in Britain. Birds that, by size and colour, were probably Continental immigrants have been excluded, as have others taken on the east coast during the migration seasons. It has also been necessary to exclude Irish specimens, as the great majority of those examined were collected in only two different years and for some reason, possibly due to selection of the specimens, contain a far higher proportion of old birds than in any other samples examined from northern parts of Europe. Those that remain, collected in many different years, may be taken as a reasonably unbiased sample of British-bred birds.

TABLE I—NUMBERS OF OLD AND YOUNG BLUE TITS (*Parus caeruleus*) COLLECTED IN BRITAIN

	Adult	First-year	% adult
October-November	16	66	20 ± 4
December-February	67	151	31 ± 3
March-June	36	84	30 ± 4

Of 120 birds taken in the breeding season or shortly before (March-June), only 30% were more than one year old. On the assumption that the population of Blue Tits is more or less stable over the years, it follows that the annual mortality of adults is about 70%*. This appears to be higher than for any other bird whose mortality has been calculated (Lack, 1954 a, pp. 91-92), but not unreasonable in view of the large number of young produced by the Blue Tit in this country. (It should be noted that if there is any tendency for collectors to reject worn specimens, this estimate of adult mortality will be a little too low.)

The percentage of old birds collected from December to February is almost the same as that of those collected during the breeding-season, but it is higher than the percentage of those collected in autumn (this difference is not quite significant statistically). The most probable explanation is that in autumn the juveniles are still suffering the heavier mortality that is normal for young and inexperienced birds (Lack, 1946). The similarity of the spring and winter percentages suggests that by the end of the autumn the juveniles are no longer at a disadvantage. This was found in other Passerines by Lack and provides corroborative evidence that the conclusions from specimens are reliable.

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* This figure, as others quoted in this paper, differs slightly from that given by Lack (1954 a), due to the examination of some additional material.

THE RELATION BETWEEN ANNUAL MORTALITY AND REPRODUCTIVE RATE

If we accept the view that clutch-size in birds is adapted to the greatest number of young that the parents can efficiently rear (Lack, 1954 b), a view that is consistent with many of the known facts, then in any stable population the death-rate must be adjusted to the breeding-rate; in other words, the more (or fewer) offspring that can be produced during the breeding-season, the heavier (or lighter) the mortality must be at some other time of the year. But in theory it is not necessary that the annual mortality of adults should be affected by the reproductive rate: only the juvenile mortality might be affected, so that by spring the number of young birds in the population might tend to be more or less constant in spite of variation in the reproductive rate.

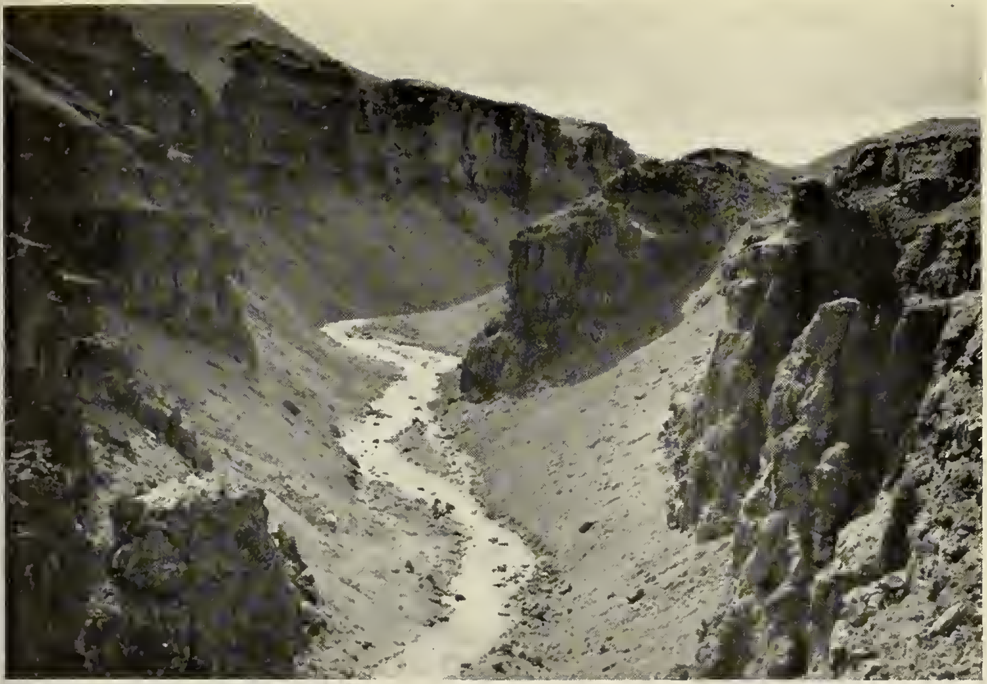
TABLE II—NUMBERS OF OLD AND YOUNG BLUE TITS (*Parus caeruleus*) IN THE BREEDING-SEASON, AND CLUTCH-SIZE

	Adult	First-year	% adult	Clutch
Britain	36	84	30	11.6
Northern Europe	20	37	35	9.9
North Africa	25	34	42	7.5
Iberian peninsula	26	21	55	6
Canary Islands	22	18	55	4.3

Notes: (1) N. Europe includes Scandinavia, European Russia, Baltic States and Poland.

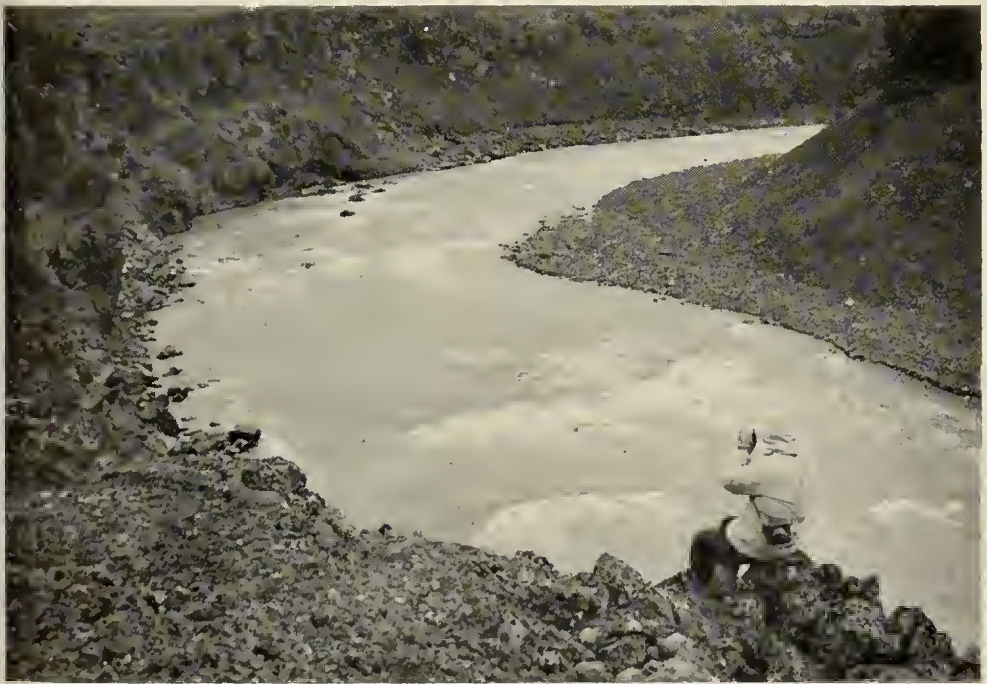
(2) Clutch-sizes as follows:— Britain, average of those given in Table 8 in Lack (1955); N. Europe, as given for Sweden by Lack (1950); North Africa, average of those given by Heim de Balsac (1952); Iberian peninsula and Canary Islands, as given in Lack (1947).

Table II shows that adult mortality is in fact related to clutch-size. This table gives the numbers of old and young birds collected in the breeding-season in Britain and four other parts of the range from which there are large enough samples to give reliable percentages, and with them the clutch-size for each area. It will be seen that there is an inverse correlation between the percentage of old birds and clutch-size. Blue Tits in Spain and the Canary



Niall Rankin

NESTING HABITAT OF PINK-FOOTED GOOSE (*Anser arvensis brachyrhynchus*)
Krossárgil, North-Central Iceland: June 1954

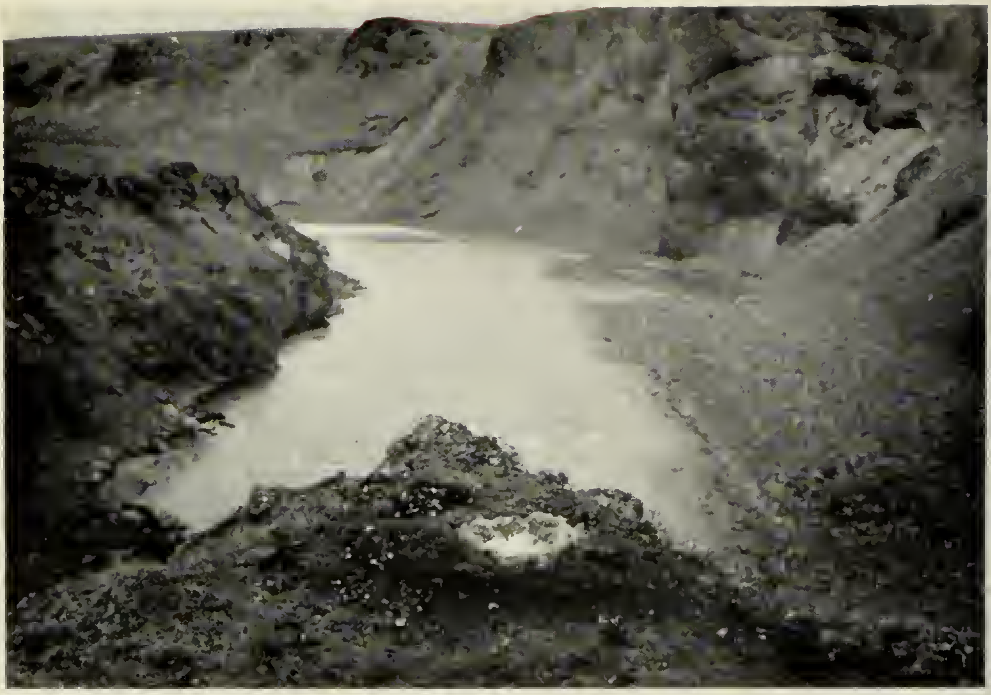


G. K. Yeates

NESTING HABITAT OF PINK-FOOTED GOOSE (*Anser arvensis brachyrhynchus*)
Gorge of the Skjálfandafljot at Hrafnabjörg, North Iceland: June 1954
Krossárgil is the gorge where the interior-nesting geese of Iceland were first authoritatively identified as Pink-feet, by W. M. Congreve and S. W. P. Freme in 1929. Here at Hrafnabjörg, they nest in mid-cliff, on the pinnacles and on buttresses and promontories on top.

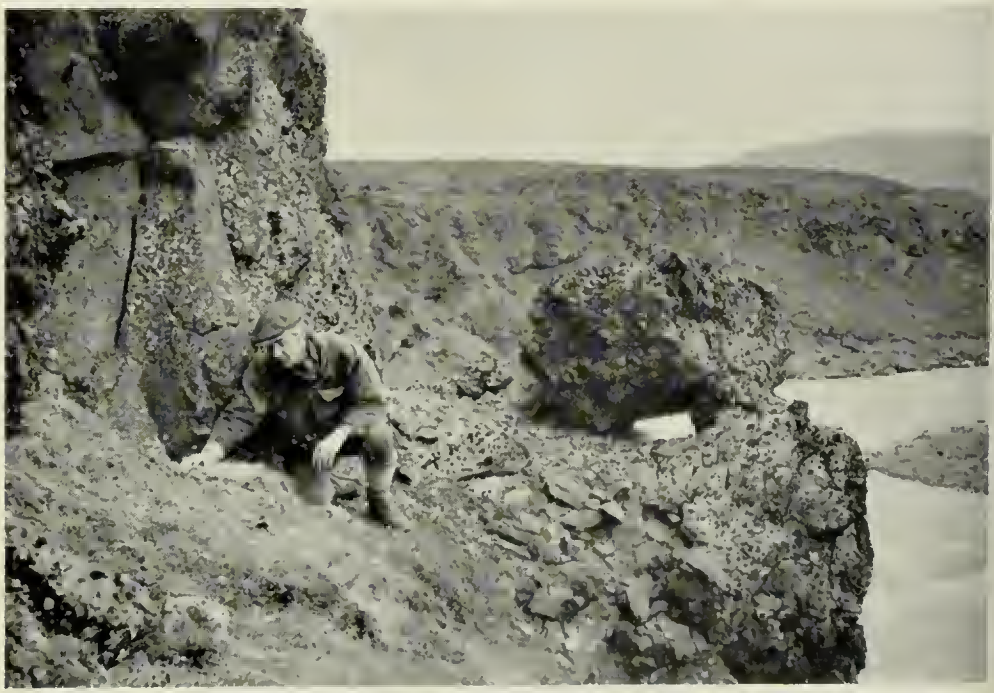
Plate 10

NATURAL HISTORY



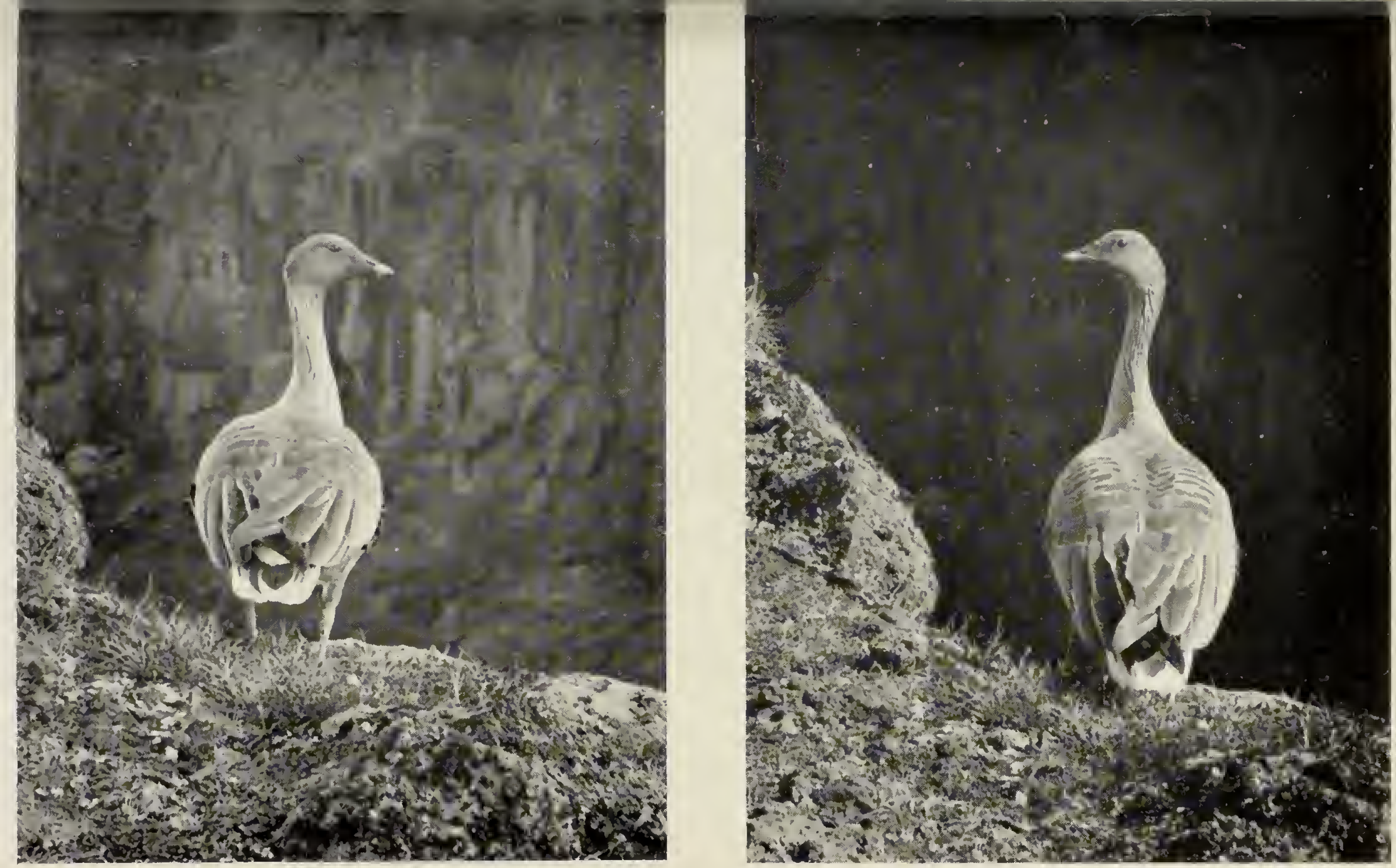
Niall Rankin

Nest and eggs of Pink-footed Goose (*Anser arvensis brachyrhynchus*)
Hrafnabjörg, North Iceland: June 1954
A typical promontory or buttress site, giving excellent defence against attack by foxes (see page 173).



Niall Rankin

Nest-site of Pink-footed Goose (*Anser arvensis brachyrhynchus*)
Hrafnabjörg, North Iceland: June 1954
A site in mid-cliff, immediately below the figure in plate 9 (lower).

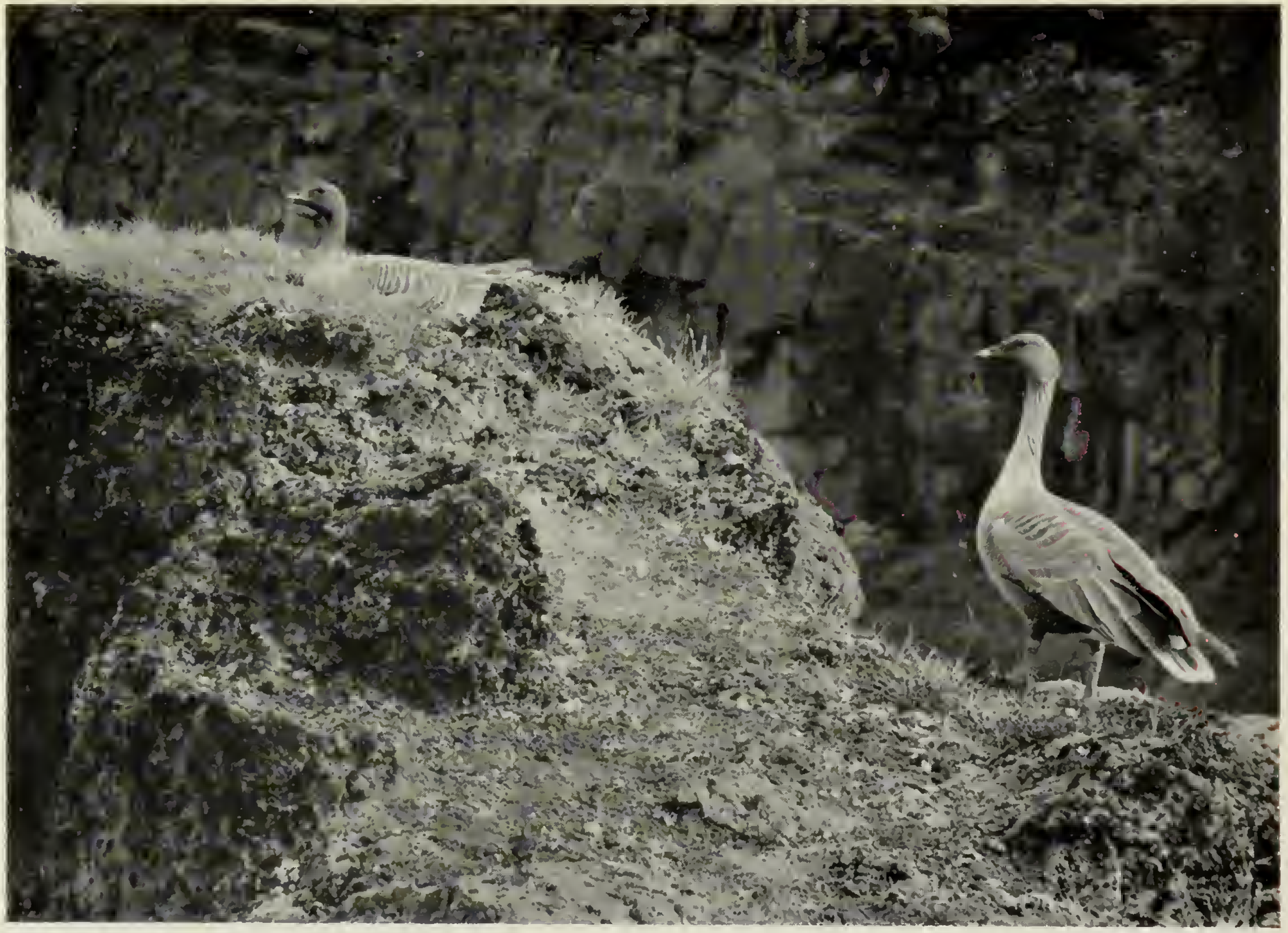


G. K. Yeates

PINK-FOOTED GOOSE (*Anser arvensis brachyrhynchus*)
Krossárgil, North-Central Iceland: June 1954
The gander on guard near the nest. These plates show clearly the short and rather delicate beak which is a feature of this species of goose (see page 172).

PLATE 12

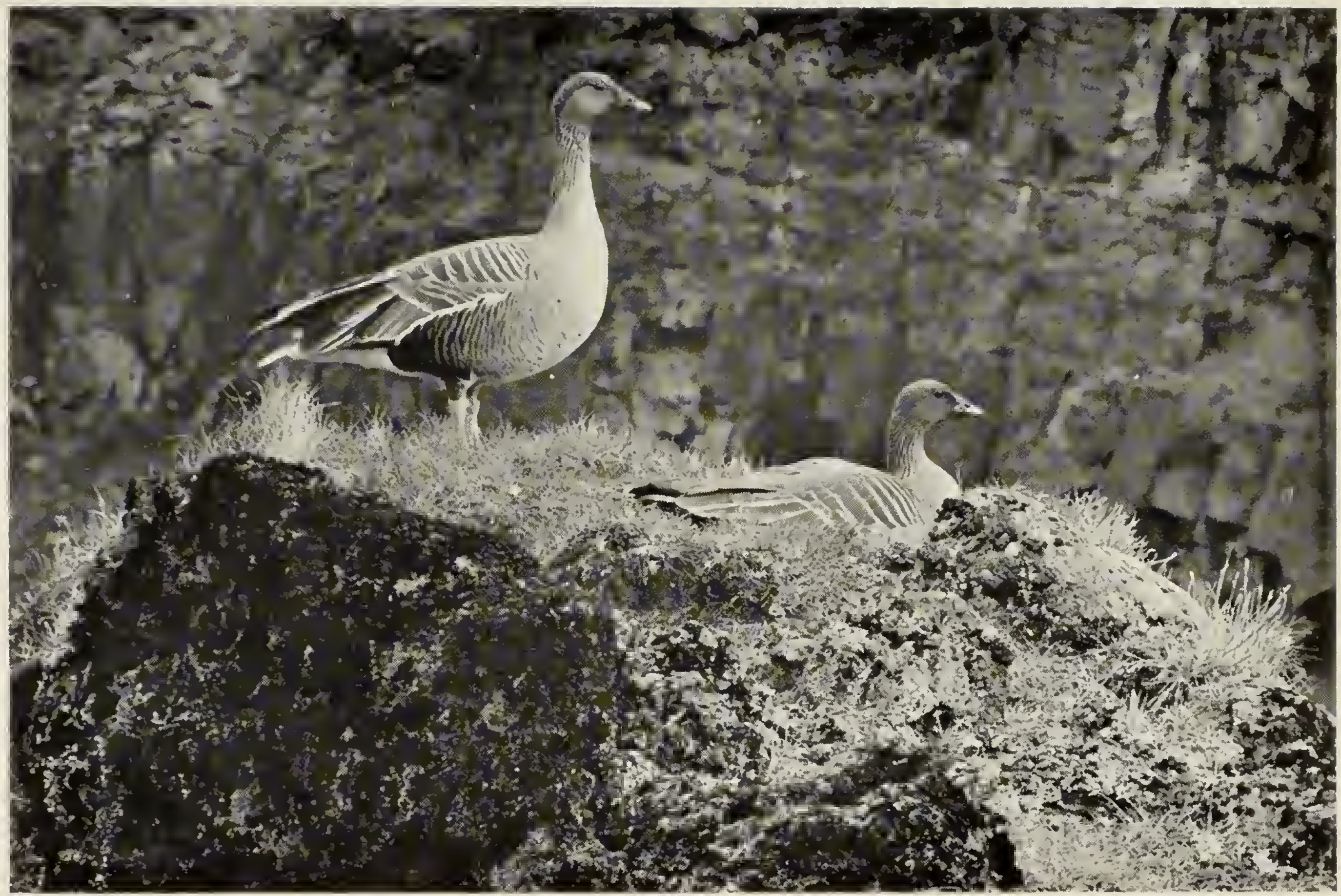
AL HISTOR



G. K. Yeates

PINK-FOOTED GEESE (*Anser arvensis brachyrhynchus*)
Krossárgil, North-Central Iceland: June 1954

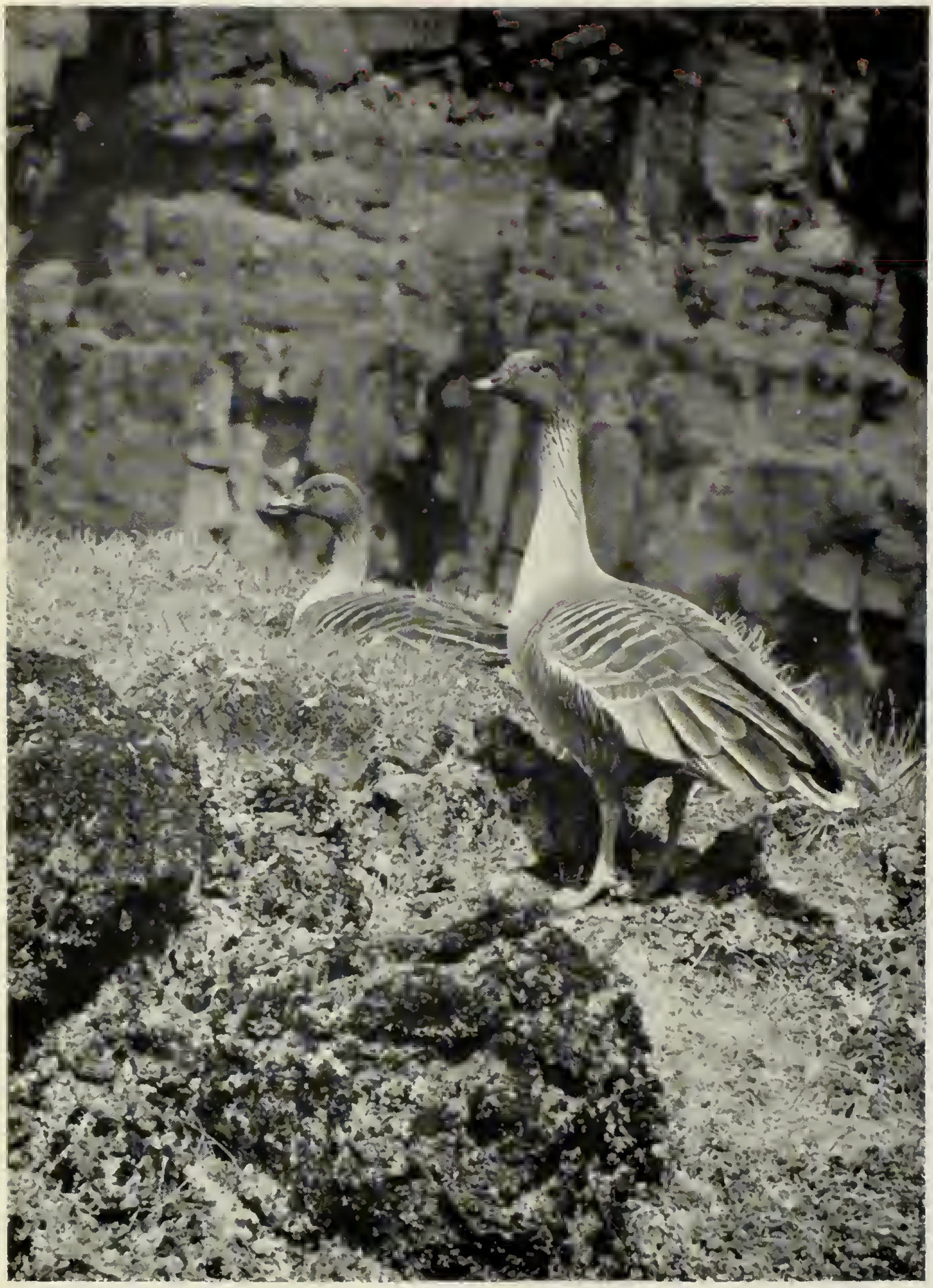
the sitting goose, and normally



Niall Rankin

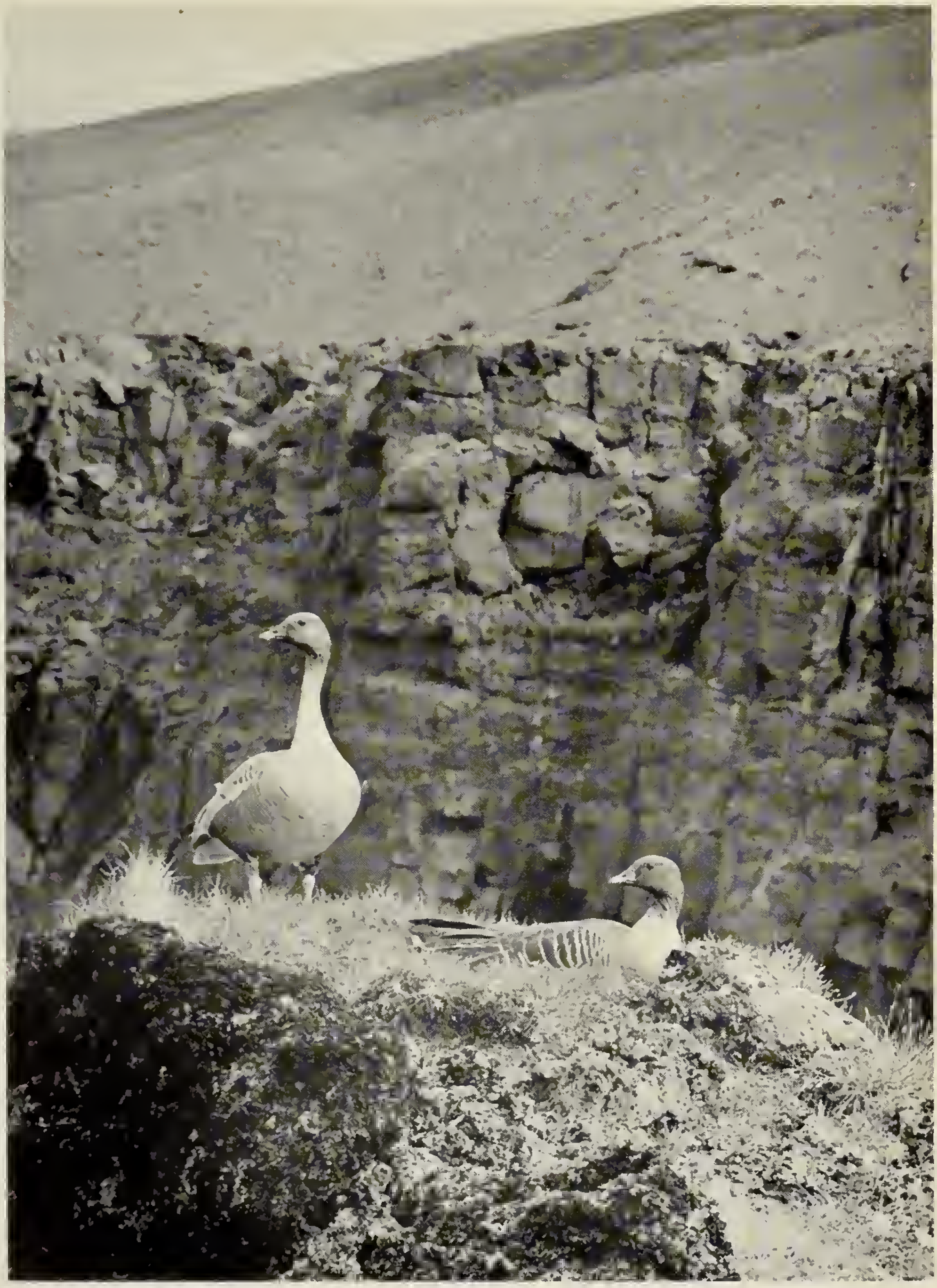
PINK-FOOTED GEESE (*Anser arvensis brachyrhynchus*)
Krossárgil, North-Central Iceland: June 1954
The basalt and lava gorges of Central Iceland are almost bereft of vegetation. The geese use the same nest-sites for many years, and, thanks to the droppings of the breeding birds, little oases of grass occur round the nests (see page 173).

NATURAL HISTO



G. K. Yeates

PINK-FOOTED GEESE (*Anser arvensis brachyrhynchus*)
Krossárgil, North-Central Iceland: June 1954
Both birds have detected the approach of danger, and are alert. The gander is in fact standing on tip-toe.



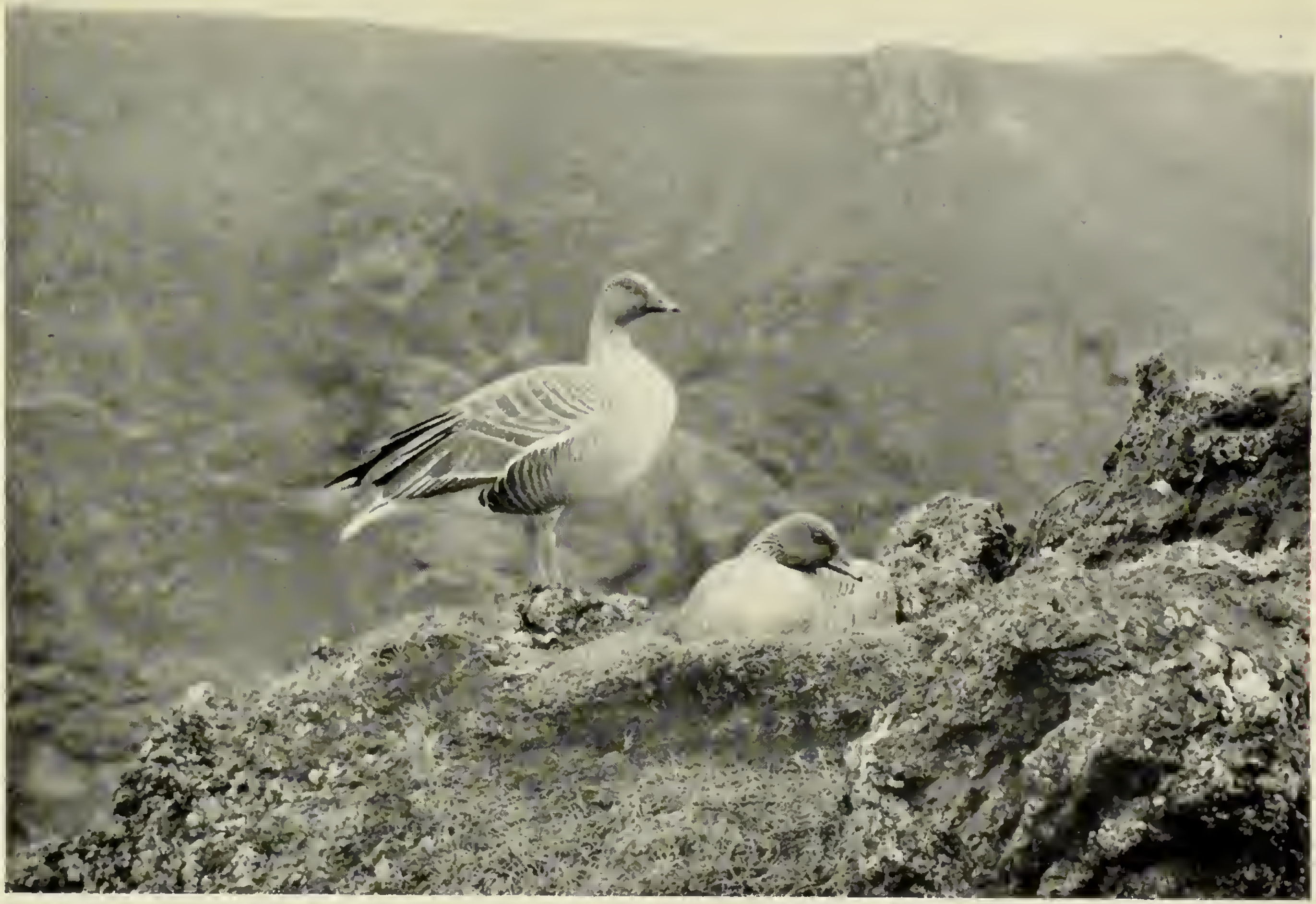
Niall Rankin

PINK-FOOTED GEESE (*Anser arvensis brachyrhynchus*)

Krossárgil, North-Central Iceland: June 1954

This shows clearly the citadel of the nest-site, with only one side to protect against possible attack from foxes. On all sides except the narrow approach is a sheer drop of 100 feet. The slopes of the hill behind are a barren scree.

NATURAL HISTORY



Arnold Benington

PINK-FOOTED GEESE (*Anser arvensis brachyrhynchus*)
Hrafnabjörg, North Iceland: June 1955
The gander on guard by the sitting goose. It will be observed that he has on his right leg a ring, almost certainly put on by the Wildfowl Trust either in Iceland or in Britain (see page 172).

Islands, where the clutch-size is very low, are almost twice as likely to survive from one breeding-season to the next as are British birds.

Thus Blue Tits can either breed slowly and live longer, or breed faster and die sooner. It is suggested that the control lies, ultimately, not in the mortality factors themselves, but in the number of young which they can produce annually in the area in which they live.

SUMMARY

1. The annual mortality of the Blue Tit is estimated by the proportion of first-year to adult birds in museum specimens collected in the breeding-season.

2. In the British population the annual mortality of adults appears to be about 70%.

3. The figures indicate that the mortality of juveniles is higher than that of adults in October and November, but from December onwards juvenile and adult mortality are about equal.

4. Annual mortality of adults in different parts of the range is correlated with clutch-size.

ACKNOWLEDGMENTS

I am indebted to many people, too numerous to mention individually, for making available to me the specimens from which the data used in this paper were drawn.

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NOTES

Mimetic posturing of Red-backed Shrikes. — A considerable amount of time was spent in 1955, and to a lesser extent in 1954, in an attempt to plot the breeding distribution of Red-backed Shrikes (*Lanius collurio*) in parts of the New Forest, Hampshire. It is frequently cited in the literature that this bird is both conspicuous and garrulous in its breeding territory, so that the attention of anyone interested is soon drawn to both the birds and the nesting locality. Generally speaking, I found that the behaviour of the New Forest birds was quite the opposite to this. Indeed, in the three years prior to 1954, when no special search was made for the species, but when much time was spent in suitable shrike habitat, only one pair was located. In 1954, after the first pair had been found, a careful search of the surrounding area produced four pairs within a mile square. In 1955, ranging over a wider area, at least twenty breeding pairs were recorded. At one time a common and familiar breeding bird in Hampshire, it has generally come to be regarded in recent years as a rapidly disappearing species.

On several occasions in 1955 well established pairs were found in areas which had previously been searched well, without any sign of Red-backed Shrikes being found. At other times, when frequent visits were being made to nests, no sign of either bird was seen, except when the incubating female was flushed. Usually, however, the cock did show up on one or two occasions during the incubation period, although these brief sightings were sufficiently infrequent to make the location of new pairs very much a matter of chance.

On 20th June 1955 the first clue was obtained to where these missing cocks were hiding, when one was watched in a particularly striking mimetic posture. Subsequently two further records were obtained, which suggested that this method of concealment might be a regular feature of Red-backed Shrike behaviour. The three occurrences are recorded below in chronological order: —

(1) The cock of Pair 4 was first located through binoculars at a distance of about quarter of a mile sitting on the dead branch of a thorn bush. As we approached it across open ground, it gradually became visible to the naked eye. When within twenty or thirty yards, it still retained its perch, but gradually adopted a strange flattened posture. At fifteen yards my wife stood still, facing the bird, as I walked round in an arc. As I did this the bird slowly followed me round, until, after passing through about 130° of arc, I hid behind a bush. It then redirected its attention to my wife, thus enabling me to obtain a good side view of the posture. I then approached it to within three yards, and found that even at this range it was almost impossible to distinguish the bird from the surrounding dead twigs, and even when clearly

discernible it was most difficult to believe that it was in fact a bird. At this stage the bird flew off. The female was incubating two eggs at the time in a low blackthorn bush about ten yards away.

(2) On the evening of 28th June 1955, soon after locating a pair of Red-backed Shrikes in a clump of bushes which had been looked at on five separate occasions during the past week, many shrike-like droppings were found below a holly bush about quarter of a mile away. On glancing up I found a cock shrike of a new pair (9) sitting on a dead branch in the same mimetic posture as that of the cock of Pair 4, at a distance of only three feet, and slightly above eye level. It then immediately flew off. I felt sure that this bird would not have moved had I not paused to look up. The hen was incubating four erythristic eggs about five yards away.

(3) I revisited Pair 4 in the morning of 2nd July 1955. After searching the cock's regular perches through binoculars I eventually saw it sitting upright and quite still about 50 yards away. As I approached, it gradually adopted the mimetic posture, and permitted me to come within four feet before flying off. The hen was then brooding two small nestlings.

On several other occasions birds were seen flying from bushes at close range, and it was suspected that they, too, were disturbed from their concealing posture.

The circumstances in which these observations were made have been described in some detail, as it is considered that they have considerable significance to the facts related. I can find no mention of this behaviour having been recorded elsewhere, and it remains for future work to show how widespread and how regular is the practice. Obviously it has high survival value, and is probably one of the main factors in accounting for the apparent scarcity of the species, at least in the New Forest area. Maybe it occurs more commonly during incubation and the early chick stage, when the cocks are less in evidence, than it does later. When both birds of the pair are feeding young, they show up more readily, though even then they can be remarkably elusive.

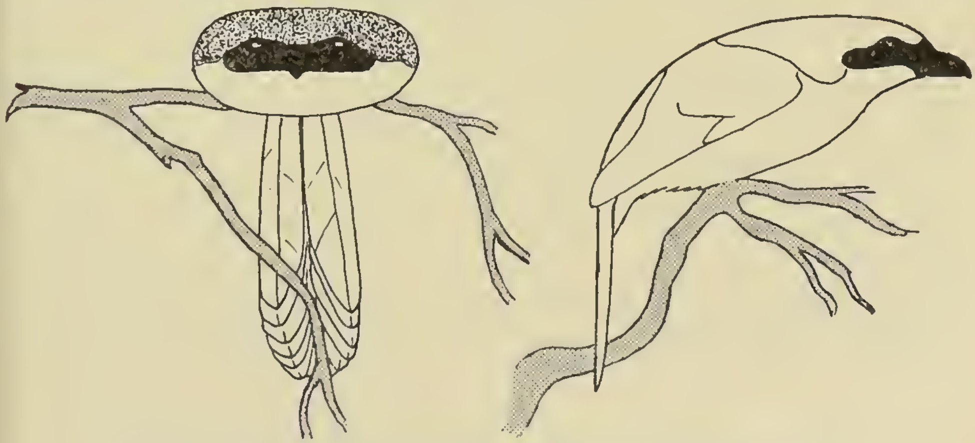

FIG. 1—FRONT AND SIDE VIEWS OF MIMETIC POSTURE OF MALE RED-BACKED SHRIKE (*Lanius collurio*)

Description of posture.

Front view (Fig. 1a): the head and body is flattened ovoid in shape, the black facial markings in the centre resembling a mask. Through binoculars one can see that the eyes are fully rounded and look straight ahead. The tail hangs down below the oval of the body.

Side view (Fig. 1b): the upper-parts were noted as being curved in an almost perfect arc from the forehead to the tip of the tail. A stiffened (wooden) appearance combined with this curved effect produced a most unbird-like object. In no case were the legs visible, being either hidden from view by the twig on which the bird rested, or concealed by the feathers of the flattened body.

JOHN ASH

Orphean Warbler in Dorset. — An Orphean Warbler (*Sylvia hortensis*) was trapped and ringed at Portland Bill, Dorset, in the evening of 20th September 1955. It was thoroughly examined in the hand by Dr. J. F. Monk and myself, assisted by S. R. Hatch and Miss U. Wall, and later also seen by A. J. Bull and Alan Till.

The following points have been selected from the full description submitted with this note. Strikingly large, whitethroat-shaped, with stout slate-grey legs and blackish bill. Iris dirty greyish-white. Very dark lores and ear-coverts contrasting with paler grey crown (not brownish) and white throat. Upper-parts otherwise fairly uniform greyish-brown, lacking rufous tinge of Whitethroat (*Sylvia communis*). Breast whitish, faintly suffused pinkish-buff; flanks brownish-buff, tinged pink; under tail-coverts paler pinkish-buff; belly white. Outer tail-feathers mainly whitish; rest mostly with pale tips, diminishing towards central pair. Wing 78 mm.; weight 21.2 gm. Shape and general colouration suggestive of a very large Lesser Whitethroat (*Sylvia curruca*); dark "mask" and stout bill gave head an almost shrike-like appearance.

It was not seen in the field except on release, when it showed white outer tail-feathers as it flew away and disappeared into a large bramble-bush. From iris-colour, it seems probable it was a first winter bird; if so, the grey crown suggests it was a male, though *The Handbook* states that both sexes in first winter have brownish crowns almost uniform with upper-parts. Alternatively, if it was an adult female, the iris-colour did not agree with "pale yellow to yellowish-white" described in *The Handbook*. As in the case of the Whitethroat, it may be that there is an extensive overlap in external characters of age and sex between young males and adult females, making most of them indistinguishable.

This is apparently the fifth or sixth British record of the Orphean Warbler, the first since 1916 and the first in Dorset.

K. B. ROOKE

Unusual nest-site of Hooded Crow.—Whilst driving along the main road past Loch Bee, South Uist (Outer Hebrides), on 19th May 1955, we noticed a nest built on the lowest arm of a telegraph pole, and a closer examination revealed it to be that of a Hooded Crow (*Corvus cornix*) with the bird sitting. This species is common on the island, nesting on the hilly east side, but it seems strange that this normally wary bird should nest by the busiest road on the island along which cars and buses are passing frequently. There is no mention of such a site in *The Handbook*.

KEITH S. MACGREGOR, FRANK D. HAMILTON and J. D. R. VERNON

[We do not know of any other records of Hooded Crows using such a site, at least in the British Isles, but there are many instances of the closely related Carrion Crow (*C. corone*) doing so. This is particularly the case, as one would expect, in areas where the bird is sufficiently common for there to be a shortage of normal nesting-places. Such an area is Dungeness, Kent, where the Carrion Crow has been increasing enormously since about 1919. N. F. Ticehurst (*Hastings and East Sussex Naturalist,* vol. viii, no. 1, pp. 10-11) summarizing the change in the status of this bird in that area, includes the following sites: the small platform at the top of a signal post on a disused railway; the space between two chimney-pots on derelict coastguard houses; the interior of a large wooden "G" on the top of a tall pole (a War Department mark) and similar site in one half of a "W"; the top of a gun-mounting; the top crossbar of a telephone pole.—EDS.].

Kestrel nestlings fed on Starlings. — A Kestrel's (*Falco tinnunculus*) nest was kept under observation at Hog Hill, Essex, during the years 1954-55. During 1954, when 5 young were reared, nothing unusual was noted in the nestlings' diet; a known plucking-block adjacent to the nest-site was occasionally examined and usually the entrails and other remains of small rodents were seen. In July 1955 three young hatched, and at about ten days old their diet appeared to consist of small rodents, no bird-remains being seen. However, when the nestlings were about 17 days old juvenile Starlings (*Sturnus vulgaris*) began to figure prominently in the diet, the bottom of the nest being lined with their remains. Also present were the remains of one of the young Kestrels (which may have been killed by its nest-mates as it was the smallest of the brood) and the right wing of a Greenfinch (*Chloris chloris*). A further check on the nest was made when the young Kestrels were about 24 days old and more Starling remains, plus the foot of some other small Passerine, were found (the nest had been cleaned at the previous visit). In all, 24 pairs of wings of juvenile Starlings were removed from the nest, and since all visible remains, including pellets, were examined, and no other prey was identified, it would appear that the diet of these young Kestrels consisted almost exclusively of Starlings.

Five B.T.O. rings were among the remains and all were from juvenile Starlings ringed at Romford Ringing Station (5 miles S.E.) during May, June and July 1955.

A. C. Parker and D. J. Summers

[We should be glad to hear of any other records of Kestrels feeding to a large extent on birds. While this seems to be unusual, there was from several areas during 1955 a suggestion that Kestrels were turning more to birds for their prey. This might be due to one of two indirect effects of myxomatosis and the absence of rabbits: on the one hand, the increased length of grass might have been making it difficult for predators such as Kestrels to locate and catch small mammals; on the other, we know through the work of H. N. Southern on Tawny Owls (*Strix aluco*) (unpublished) that competition for the small ground rodents was greatly increased and their numbers dropped well below the average.—Eds.].

House Martins perching on tree to feed.—The subject of House Martins (*Delichon urbica*) and Swallows (*Hirundo rustica*) perching on trees has already been discussed at length (*antea,* vol. xlii, pp. 246-247, and vol. xliii, pp. 254-256) and it was pointed out that most of the records given referred to the late summer. R. W. H. Nind suggested (vol. xlii, pp. 247) that the warm weather had attracted insects to the topmost foliage of the trees and thus drawn the attention of the House Martins.

I can now record an instance of this behaviour that supports this theory. During the very hot afternoon of 21st August 1955, at Sopwell Mill, near St. Albans, Hertfordshire, I saw about a dozen House Martins on the leafy topmost branches of an elm tree; they were clinging to the twigs and through the glasses could be seen to be picking small insects from the leaves. An investigation of the lower branches of the tree revealed only a few odd insects, but a stick hurled to the top of the tree produced a veritable cloud of small flying insects. Bryan L. Sage

Siberian Chiffchaff in Dorset.—In recent autumns, at Portland Bill, Dorset, Chiffchaffs (*Phylloscopus collybita*) have occasionally been seen which it was strongly suspected belonged to one of the northern races, *abietinus* or *tristis*. On 14th October 1955 an unusually plumaged Chiffchaff was seen. This bird had remarkably greyish upper-parts, with a whitish supercilium and under-parts, and dark legs. It was so different in appearance from previous "Northern" Chiffchaffs, that it was at first thought to be some other species of *Phylloscopus*.

At 13.15 G.M.T. it was trapped, and the following details recorded in the laboratory (brief excerpt):—all upper-parts a uniform dark olive with a distinct greyish suffusion (the latter was less apparent in the hand than in the field); the under-parts were all whitish without any trace of yellow anywhere, the upper breast being pale greyish-buff, rather darker at sides; axillaries lemon, but none at carpal joint; the supercilium was conspicuous and whitish with no yellow; the edges to the wing- and tail-feathers were olive; wing-length, 56 mm. (both measured); 2nd primary=7th/8th; weight, 7.5 gms.

The bird was also seen by my wife, the Misses M. D. Crosby and D. York, and J. A. Wigzell. John Ash

Whinchat singing in winter-quarters.—*The Handbook* states that the Whinchat (*Saxicola rubetra*) does not sing in winter-quarters. I observed a large number of this species in Sierra Leone (1950-52) and the Gold Coast (1952-53), at the appropriate season, and heard song on one occasion only. This was near Freetown, Sierra Leone, on 4th April 1952, when a male sang the normal song several times in succession from the top of a small bush. W. E. Almond

Little Bunting in Co. Dublin. — On 24th October 1954, Mr. J. R. Dick and I flushed a Little Bunting (*Emberiza pusilla*) along with two or three Chaffinches (*Fringilla coelebs*), from a tangle of long grass and discarded branches on the shore a few yards above high tide mark at Rogerstown Estuary, Donabate, Co. Dublin. At a distance of less than twenty yards, while the bird was perched in a prominent position the small size, bunting-like shape, bright chestnut cheeks edged with black and fine black streaks on buffish flanks and whitish under-parts caught the eye immediately as did the chestnut crown. Examination later of skins in the National Museum, Dublin, appeared to confirm that the bird was a male. G. R. Humphreys

REVIEW

BIRDS AND MAMMALS OF SHETLAND. By L. S. V. and U. M. Venables. (*Oliver and Boyd,* Edinburgh, 1955). 391 pages; 8 photographic plates; 3 maps. 30s.

The islands of Shetland, meeting-place of northern and southern elements in our fauna, and maritime outpost of a region where striking climatic changes are known to be taking place, form perhaps the most important zoogeographical area in the British Isles. A fauna of Shetland should be of national rather than local stature. The Venables have met this challenge handsomely, and have produced what is perhaps the most stimulating regional study of recent years.

It is now 80 years since the publication of H. L. Saxby's *The Birds of Shetland,* and 58 years since this was followed by Evans's and Buckley's *Vertebrate Fauna.* In the past half-century numerous changes have occurred, many of them of more than merely local interest. Such changes often reflect trends and tendencies which are noticeable over a much wider area, and the north-east Atlantic region of which these islands form an integral part has long received the close attention of ornithologists, and zoogeographers in general. The time was ripe for a new and critical survey of the Shetland avifauna when Mr. and Mrs. Venables settled there 10 years ago and began work in this fascinating field. They must have realised at an early stage that their birds called for more specialized treatment than is customary in county faunistic surveys: increase and decrease, abundance and scarcity, colonization and extinction all need to be related to the special qualities of the climate and landscape, and song-periods and breeding activities to the comparative lateness of the season in these higher latitudes. The authors have succeeded well in applying considerations of biology and ecology to their field-observations, and the essays on the more important species—such as Blackbird, Fulmar, Corncrake and the wintering Whooper Swans—are models of this type of approach. The bibliography of some 350 references bears ample witness to their industry in the library as well as in the field, and the book is full of useful comparisons of status and behaviour drawn from neighbouring regions to north and south.

In addition to the systematic accounts of birds and mammals (Man, with his present difficulty in maintaining viable communities in the remoter parts of the group, is not forgotten!), the latter written with the assistance of G. T. Kay, there are chapters concerning Shetland habitats, Shetland naturalists past and present, and status changes during the past 80 years. These are ably summarized, but discussion of them is perhaps the least satisfactory part of the book. The authors take the view that "Shetland's own climate remains unaltered," whilst that of southern Greenland, Iceland, Spitsbergen and north-western Europe has undergone a progressive amelioration; but the chief evidence on which we are asked to accept this view is a series of temperature-records for the period 1871-1930 from *Aberdeen*, a North Sea port 200 miles to the south and not exposed, as Shetland is, to the warming influence of the Gulf Stream and the "tropical air" of the Atlantic lows. Air-temperature records from Bergen and Tórshavn (Faeroe Islands) down to 1920-25 are also given, but their value is dubious. There have been several striking changes subsequent to this period, and several of the earlier ones concern species more likely to respond to water-temperature, such as Common Tern, Gannet, Common Scoter and Eider.

There is much of interest in these changes. The final extinction of the White-tailed Eagle, in a land given to sheep rearing, was a foregone conclusion (the wonder is that it held on till 1910!), but the total disappearance of the once-common Kestrel and scarcer Sparrowhawk is difficult to understand. The absence of the former, incidentally, necessitates an alteration to the distribution as given in *The Handbook*, vol. iii, pp. 28). Song Thrush, Whinchat and Pied Flycatcher have undergone a spectacular increase as passage-migrants since Saxby's time, whilst the Crossbill, then a regular annual immigrant, has become extremely sporadic. Pintail, Scoter, Shoveler and Tufted Duck have colonized Orkney and begun to nest in Shetland in recent years, and are on the increase in Iceland; similarly the Black-tailed Godwit, now spreading in Iceland, has nested occasionally in Shetland and Faeroe. In Saxby's time, 1859-1871, winter visits by different races of the Gyr Falcon and the summering of Snowy Owls were apparently regular events, and both Glaucous and Iceland Gulls were commoner than now: the reviewer suggests that the recent decline in such records may well be a concomitant of the warming-up of the winter environment in Iceland, Spitsbergen and low arctic Greenland. The only satisfactory records of the nesting of the Snow Bunting and most of the visitations of the Walrus and arctic seals belong to this period. Dr. Saxby is not allowed his claim to have discovered the Turnstone breeding in Unst. The suggestion that the Great Northern Diver may have bred in recent years is more exciting, though still "not proven".

The reviewer cannot believe that the Lesser Redpoll, which breeds only in Britain (*C. f. disruptis*) and the alpine regions of Central Europe (*C. f. cabaret*) "was not particularly uncommon in Unst during the last century" as an autumn migrant. There are only 3 definite records for Shetland (including Fair Isle) in the present century, and clearly Dr. Saxby was confused about the forms of Redpoll (*flammea* and *rostrata*) visiting Shetland regularly. *The Handbook* statement that the Lesser Redpoll is "rare at any time" in Shetland must be accounted right, but in other respects the Venables' research and observations have shown *The Handbook* to be wrong, and readers should note the following corrections. There is no good record for the Magpie; the Linnet does not breed (replaced by the Twite, locally "Lintie" or "Linnet"); the Mistle Thrush is an extremely scarce vagrant and does not winter; there is no evidence that Shetland Wheatears are ever double-brooded; the Whinchat is regular in autumn, less so in spring, not *vice versa*. The recent increase in the Whimbrel and especially the Red-throated Diver is very satisfactory; that of the Great Skua, a protected species, gives cause for alarm.

Speculation as to the racial affinities of the breeding Song Thrushes (since *ca.* 1910) and Jackdaws (since 1940) are pointless in the absence (the laudable absence!) of collected specimens: both are variable species, and the migrant Song Thrushes are not exclusively "grey-backed", the mid-October passage comprising darker birds which can be separated from British skins only with difficulty. The Venables may be right in their view that the birds which have colonized Shetland during the period under review are from Scandinavian populations, representing those southern elements which have extended their range north-westwards through Europe following the general climatic amelioration. They say: "If northern Europe can now support a far larger breeding population of these species, this may well swell our wintering numbers, and so increase the chance that a few individuals may remain to breed". In other words, the colonization is the "backwash" of the main push of spring migration northwards into Scandinavia. It is an attractive theory, but at the same time there is no concrete evidence to show that this colonization is not simply a northwards extension from the British area. Future workers may find further clues, and in any event it is unlikely that the one hypothesis entirely excludes the other.

This most stimulating and authentic study will be a standard work on the ornithology of Northern Britain for very many years, and the Venables are to be congratulated on the results of their enterprise. Not only is the book full of interesting facts, lucidly interpreted and discussed, but it is most attractively produced, with excellent photographs of Shetland habitats, useful breeding-lists of birds and mammals for the separate islands, a calendar of average flowering-dates of Shetland plants, and a good working index. K.W.

LETTERS

VOLUNTARY WATCHERS NEEDED BY THE R.S.P.B.

Sirs,—The Royal Society for the Protection of Birds is urgently in need of voluntary watchers to assist in wardening the well-known reserves at Minsmere and Havergate Island in Suffolk for a week or longer, and also to act as watchers at sites of special interest.

Both Minsmere and Havergate offer opportunities of seeing a number of rare breeding species, such as Bearded Tit, Bittern and Marsh Harriers at Minsmere, and Avocets and uncommon passage waders at Havergate. A week's watching assisting the warden and keeping scientific records does provide a very inexpensive bird-watching holiday, because lodging for two watchers is provided free and the only expenses incurred are in travelling and food.

We are also seeking watchers for sites of especial interest and importance, e.g. the Bee-eaters in Sussex last year. The watcher must have good ornithological qualifications and also be able to deal firmly but tactfully with all sorts of human intruders. People who would be free to begin watching at very short notice and willing to go anywhere in England, Scotland or Wales would be most useful.

If anybody would like to volunteer for either Minsmere, Havergate or as a special watcher, we would be very pleased to hear from them. P. E. Brown

25, Eccleston Square,
London, S.W.1.

THE GUILLEMOTS OF AILSA CRAIG

Sirs,—There is a danger that Dr. J. A. Gibson's letter (*antea,* vol. xlviii, pp. 559-560) may be interpreted as good evidence that the Northern Guillemot (*Uria a. aalge*) *breeds* on Ailsa Craig. Actually, neither his recent letter nor his excellent account of the birds of Ailsa Craig (*Scot. Nat.* vol. 63, pp. 73-100, 159-177) states categorically that the Northern form "breeds", merely that it "occurs" alongside the Southern birds. Nevertheless, there is a clear inference that these birds are breeders, and in fact in *The Birds of Scotland* by E. V. Baxter and L. J. Rintoul we find the unequivocal statement, "Dr. J. A. Gibson tells us that Northern Guillemots breed on Ailsa Craig as well as the Southern " (p. 683).

That the Northern Guillemot does "occur", Dr. Gibson has now shown. But we must not accept the view that a wreck of oiled birds, which may have travelled far before wind and tide, gives a cross-section of the breeding-population of the Craig. Even if this unfortunate oiling was a local phenomenon, the date of the big wreck, 23rd August, does not preclude the possibility that birds moving south from the Hebrides were involved. There is also the complication of immature birds. We should not accept, as proof, birds actually seen on ledges at the height of the nesting-season, unless these are known to have charge of eggs or young. As with other sea-birds, large numbers of non-breeders come ashore at the colonies in summer, and although it is usual for these to segregate on the lower ledges close to the sea, their very presence demands that the utmost care be taken in any field-study concerned with subspecific identification, or counts of "ringed" individuals in the breeding-population. At those colonies I know best (in the Faeroe Islands), these non-breeders spend the later part of the summer higher on the cliffs, and the Faeroe fowlers have designed techniques, "omanfleyg" and "fygling", to exploit both groups, so that the annual catch is made up entirely of immature birds. It is not unlikely that non-breeders throng the vicinity of Ailsa Craig, and that they include many birds native to colonies farther north.

The only good evidence of the taxonomic status of the Guillemots of Ailsa Craig is contained in museums, and the half-dozen specimens I have examined are all good *albionis.* Since the Northern Guillemot certainly breeds in the Hebrides (though many Hebridean birds are not quite so dark as those in Shetland), one might expect that some mixing of the phenotypes would occur on Ailsa Craig, but I can see no evidence for this in the Royal Scottish Museum. We need only look at the situation in the east for a hint of what must surely happen in the west. F. Salomonsen, in his *Atlantic Alcidae,* shows that the breeding birds of Stora Karlsö contain a small percentage indistinguishable from *albionis,* although the majority belong to the Baltic form *intermedia,* the most isolated of all Guillemots in the Palaearctic region. Further, soon after H. F. Witherby's description of *albionis* (1923—Yorkshire), A. J. E. Lönnberg separated *helgolandica* (1923—Heligoland) as an intermediate form. If similar aggregations occur on the west side of Britain it seems likely they will be found in the Inner Hebrides: certainly, on such evidence as we have at present, there is no justification for the view that the Guillemots of Ailsa Craig are anything other than "pure" *albionis*.

Fair Isle Bird Observatory. KENNETH WILLIAMSON

SIRS,—If I may be allowed, I would like to comment on some of the main points raised by Dr. J. A. Gibson's reply to my letter concerning Guillemots on Ailsa Craig (*antea*, vol. xlviii, pp. 559-560).

1. We are approaching the truth at last. When Dr. Gibson asserted that Northern Guillemots (*Uria a. aalge*) "occurred" on the Craig, I took him to mean (as did also the authoresses of *The Birds of Scotland*, p. 683) that they occurred as part of the breeding population. Now he tells us that they occur only as occasional visitors—a very different matter.

2. Dr. Gibson says that he does not collect skins, but the first supposed Northern bird was washed up dead. Why was this valuable evidence not preserved? It would have been to his advantage if he had obtained confirmatory evidence of his identification, as would thus be possible.

3. Dr. Gibson gives no dates indicating the time of year when these " Northern birds " were recorded, except in one case, 23rd August 1948. Presumably at such a time Guillemots would be in full moult, and many of the dark head-feathers would be lost. The identification of our two races of Guillemot, according to *The Handbook* (Vol.V, p. 153), depends very largely on head-colouration. Dr. Gibson tells us nothing of all this.

4. In addition Dr. Gibson has still not supplied us with any details as to *how* he was able to identify these birds as "Northern Guillemots"—not even the minimum of plumage description. Surely such a description must be necessary before his statement can be seriously considered at all. M. F. M. MEIKLEJOHN

RUFOUS-CROWNED SHORT-TOED LARKS

SIRS,—I was interested to read Mr. Kenneth Williamson's notes on the Short-toed Lark (*Calandrella brachydactyla*) at Fair Isle on 4th May 1955 (*antea*, vol. xlviii, pp. 512-513). His description of this bird is similar to that of one I observed along the banks of the River Medjerdah at Sidi-Smail-Gare, Tunisia, on 20th April 1943.

The reddish-brown of the upper-parts of that individual, and especially the rufous crown and small crest, relieved by a distinct whitish eye-stripe, gave an entirely different appearance from the

Short-toed Larks that I have seen in Egypt, where the typical form and *longipennis* occurred in the winter, the former apparently being the commonest.

This rufous-headed form from Tunisia and other Mediterranean countries was treated as a separate race by J. I. S. Whitaker (*The Birds of Tunisia* (1905), vol. 1, pp. 280-283), although he mentioned that most ornithologists were opposed to this view. However, whether this is a good race or not it is quite distinct in the field from the *brachydactyla* that I have seen in Egypt.

C. A. White

[The form to which Mr. White refers, *C. b. hermonensis,* has now been clearly shown by Col. R. Meinertzhagen ("Review of the Alaudidae", *Proc. Zool. Soc. London* (1950), vol. 121, pp. 81-132) to be a red-headed colour phase without definite distribution but more frequent in some Mediterranean areas than in others.—Eds.].

BLACK TERN MIGRATION ON 9TH MAY 1954

Sirs,—With reference to Mr. I. C. T. Nisbet's letter (*antea,* pp. 159-160), I am quite sure that no one will have considered for one moment that my paper (*antea,* vol. xlviii, pp. 148-169) might constitute the last word on immigrations of Black Terns (*Chlidonias niger*). It will indeed be a sad day when the last word has been said about any species. However, Mr. Nisbet's letter may stimulate discussion on and further enquiry into such movements and will serve to show how easily the same set of known facts can receive differing interpretations.

Mr. Nisbet's alternative interpretation of the records is, I think, incorrect for two reasons. Firstly, during the night of 8th-9th May, east and south-east winds occurred mainly in the north-western part of France where Black Terns are seldom found in spring. Winds in mid-France were rather north of east and would have tended to take birds to the Biscay coast rather than to England. Secondly there were at least as many birds east and north of the area which Mr. Nisbet gives for their rough distribution at dawn on 9th May as there were *in* that area. For birds to be distributed as they were on that morning would mean, for many of them, a journey of 18 to 24 hours from mid-France (if they were travelling at, say, an average speed of 30 m.p.h.). The Black Terns could not, then, have been deflected and travelled from mid-France in the one night.

I cannot help feeling that Mr. Nisbet has paid too great attention to the particular weather map included in my paper (p. 158), without bearing in mind that changing weather situations and the exact positions of birds over a period of two days cannot possibly be shown on a single map. I do not know where he finds any suggestion in my paper that " the disorientated flight from the Bay of Biscay took place both by day and night on 8th and 9th May". I have little doubt that lateral winds do deflect birds during day-time flight, though perhaps to a less degree than during the night. My own opinion is that the Black Terns were deflected, probably from well east of the Biscay coast, mainly during the night of 7th-8th May, and were carried northwards west of Brittany during that time. Reorientating themselves during the day of 8th May would result in the birds flying in an E. and N.E. direction *into* the wind. The first apparently began to reach Britain during that day—a point of which Mr. Nisbet's theory takes no account. Others flying through the night of 8th-9th May, would be slowed down but not deflected again by the wind which was now a headwind. The distribution of birds across Britain from west to east at dawn on 9th May and their continuing passage in the same direction can be explained in this way. What I do find difficult to explain is the lack of records from Wales in view of the large numbers of birds both in the Bristol Channel and also in Cheshire and Lancashire. R. F. DICKENS

BLACK TERNS IN AUTUMN 1954

SIRS,—In your July 1955 issue (*antea,* vol. xlviii, pp. 300-307) you published a paper, by Alec Butterfield and Kenneth Williamson, on the passage of Black Terns (*Chlidonias niger*) in Britain in the autumn of 1954. I feel it is necessary to point out that this analysis was marred in detail to a certain extent by misunderstanding and omission of the East Anglian records. The writers mention no Black Terns for the Wash/Fens before 9th September 1954, when "more than 200 birds appeared over Terrington Marshes in Cambridgeshire with a further 20 at King's Lynn". In fact, Terrington Marshes are not somewhere inland, as is implied, but in Norfolk: they comprise the western bank of the Ouse estuary on which King's Lynn itself lies—the southern extremity of the Wash.

Further, there was thus no reference to the fact that in this same locality there had been a flock from at least 21st August 1954, when watching began there. It numbered 27 on 21st August; up to 32 from 23rd to 27th August; 50 on 28th August; increasing daily to 140 on 1st September. The next count was on 9th September, when there were 220 in the Ouse estuary. Of this flock, which appeared at the mouth of the river with each high tide, a substantial proportion (up to 53) flew inland on each of these dates. In addition, in the western corner of the Wash, there were 100 Black Terns in the Welland Estuary on 31st August and 1st September; no later visits were made there. In Blakeney Harbour on the north Norfolk coast there was a flock of 20-30 on 11th August, and 25-30 on 25th August.

None of this is mentioned in the paper and consideration of it surely makes some difference to the conclusions drawn. I consider it is likely that there was on the East Coast, probably for about a month, a large, increasing permanent flock of Black Terns, slowly filtering inland. The movement of 9th September probably marked the peak of this phenomenon. But having regard to the fact that the Wash flock appears now not as a sudden "fall" but rather as a more gradual "build-up", it is difficult to place complete confidence in Messrs. Butterfield's and Williamson's interpretation of the movement of 9th September. We are told that on that day two flocks totalling 18 birds reached Ireland, and that "smaller numbers (than 20) occurred at various points from Teesmouth, Yorkshire, to Slapton Ley, Devon". Without the details being published this is not very helpful—especially if the data should prove as inadequate as those given for East Anglia. T. C. SMOUT

SIRS,—The responsibility for any "misunderstanding and omission of the East Anglian records" in our paper on the autumn migration of the Black Tern (*Chlidonias niger*) in 1954 (*antea,* vol. xlviii, pp. 300-307) rests largely with those observers who did not respond to our appeal for information on this subject (*antea,* vol. xlvii, p. 450). It is indeed a ludicrous situation that an observer should choose to withhold germane information, and then blame the authors because the published report is marred as a result!

Apart from the records for 9th September, we received no reports of outstanding movements in East Anglia, and although some new data came to hand when our paper had reached the page-proof stage these did not call for a revision or modification of our interpretation, nor did they merit the upheavel which would have followed extensive alterations to the text at that late stage. Not until the paper had appeared was our attention drawn to the full extent of the migration in East Anglia, as now set forth in Mr. Smout's letter.

As readers will readily appreciate, the amount of information which observers were good enough to supply was very large, as it almost always is in such cases. The Black Tern passage lasted for three-and-a-half months and covered the whole of the British Isles south of the Forth-Clyde valley: small wonder, then, that a conservative estimate of the space needed to print *the records alone* was over seven pages. Had we supplied comment and analysis to all these records, the paper might well have grown to twenty pages. We felt that readers (not to mention editors and publishers) would prefer a paper as brief and concise as was compatible with a true digest of the situation over the country as a whole, and a discussion of the salient features. This involved selection of the data, and we took the greatest care to ensure that we presented a fair and balanced picture of the migration as conveyed by the information before us.

That this was the better choice we have no doubt, and it would seem to be justified by the fact that the considerable body of data

PURCHASED

which Mr. Smout now publishes does not in any way disturb the general picture or conflict with our main conclusions. Mr. Smout suggests that there was on the east coast, "probably for about a month, a large, increasing permanent flock of Black Terns, slowly filtering inland". But apart from the 20-30 birds at Blakeney Harbour on 11th August, this large flock was not known to be in the area until 21st August. Nor has any evidence been given of movement inland before the peak-day of 9th September. This being so, it is possible that most or all of the birds of the 21st may have reached the Wash with the cyclonic drift of 19th August (*op. cit.*, fig. 4), whilst the gradual build-up from the 27th to the end of the month coincides with the many scattered records which followed the influx of the 25th (fig. 5), "of the residue of this latter invasion moving on in better weather" (p. 306). In other words, it may be that "onward passage" birds were gradually accumulating in this region, which is well known to be attractive to Black Terns.

There is no evidence that the large numbers which were at Terrington Marshes (140) and the Welland estuary (100) on 1st September stayed there over the next eight days. Birds were certainly on the move in most parts of the country at the end of August and probably into September, since records during the first week were mainly confined to the east coast bird observatories, close to the main migration route (p. 302). The heavy concentration in the Wash on 9th September may well have been due to the cause given in our paper (pp. 304-305), especially as it is clear that a number of birds were actually migrating, passing inland up the River Ouse. The extra data now brought forward support rather than conflict with our main conclusions, though it must be admitted that the lack of information from this important area prior to 21st August and between 1st and 9th September leaves serious gaps and does not permit us to draw a complete picture of the situation in the southern North Sea and Channel regions.

ALEC BUTTERFIELD and KENNETH WILLIAMSON

REQUEST FOR INFORMATION

"Soiling" on the faces of leaf-warblers.—In Jersey, during the spring migration of 1955, numbers of *Phylloscopus* warblers were seen to have a black substance covering the feathers around the bill. Several were caught—these all proved to be Chiffchaffs (*Ph. collybita*)—and samples were taken of the substance. A bird in an apparently similar condition was seen by Mrs. J. B. Cowdy in Buckinghamshire. In the spring of 1956 birds in the same state have again appeared in Jersey—one of those caught was a Willow Warbler (*Ph. trochilus*)—and further samples have been taken. Preliminary analysis of the substance has already been made by Mr. K. H. Palmer and this is being followed up by Professor P. Allen. It seems possible that some of these "soiled" birds may have been observed in other parts of Britain and we should be grateful if any records could be sent to Mr. W. D. Hooke, Société Jersiaise, The Museum, Pier Road, Jersey, C.I.

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BRITISH BIRDS

PREDATION AND PROTECTION AT DUNGENESS BIRD RESERVE*

By H. E. Axell

(Plates 17-18)

INTRODUCTION

This paper summarizes what have seemed to be the more significant of the data obtained during the seasons 1952 to 1955 when efforts were first made to restore a once-successful gullery and a ternery. During the period of the 1939-45 war the colonies had become seriously depleted by human interference and by high populations of natural predators. The results of the protective measures adopted are regarded as preliminary and subject to review in the light of future experience gained from observation of the now annually changing relationship between the predators and the prey available to them in the area. The effects of recent control of some predators have been considerably complicated by the repercussions from myxomatosis.

DESCRIPTION

The promontory of Dungeness is a south-eastward extension of Romney Marsh, in Kent. Its area of ten square miles of shingle, the largest in Great Britain, is made up of a series of broad, low ridges, each of which originated as a shore bank built up by past storm periods. On some large, still unspoiled areas west from the ness, the ridges are patchily topped with mats of lichen. Viper's bugloss, catchfly and foxglove are common in places but most of the vegetation is short (e.g. sea campion, thrift, stonecrops and fescue). Gorse, prostrate broom and creeping bramble are increasing their coverage of the shingle. The Reserve owned by the Royal Society for the Protection of Birds covers 1,233 acres of this land and its eastern boundary lies about one mile to the west of the point of Dungeness. Inland the Reserve includes part of the sallow, blackthorn and elder scrub area which roughy separates the shingle tracts from the rich alluvial farmland of the Marsh proper. A small river, the Dengemarsh Sewer, runs through the Reserve which also includes the Hoppen (or Open) Pits—large, fresh-water ponds thickly edged with reed, sedge and scrub. The first warden on the Reserve was appointed by the R.S.P.B. in 1907.

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* A publication of the Royal Society for the Protection of Birds.

THE COLONIES BEFORE 1940

The part of the Reserve with which this report is principally concerned is that area of Dengemarsh Beach between the sewer outfall (" Pen Bars " on Ordnance Survey maps) to Galloways a little more than a mile to the west and to the shingle fringe about three quarters of a mile inland. In this square-mile sector of sparsely-vegetated shingle, the colonies, protected by R.S.P.B. wardens, had considerable success in the 1930s.

LESSER BLACK-BACKED GULL (*Larus fuscus*).—A pair was first known to breed in 1908. In 1932 there were three pairs and by 1938 there were 19 pairs breeding mainly within the Herring Gulls' territory.

HERRING GULL (*Larus argentatus*).—The first pair bred by the Hoppen Pits in 1908. No appreciable increase took place until a colony developed, in 1925, at its present site *ca.* 500-800 yards inland from the shore between the Dengemarsh Sewer and Galloways. During 1936-39, various estimates put the colony's strength between 350 and 700 pairs (Harrison, 1953; Ticehurst, 1953; H. A. R. Cawkell and R. G. Williams, personal communications). Attempts to check the spread into the ternery area were made by the wardens' taking or " killing " a few hundred eggs annually, on the south side of the gullery.

COMMON GULL (*Larus canus*).—The species is especially interesting at Dungeness where it occupies the only breeding site south of the Scottish border. Four pairs first bred in the area in 1919 and by the outbreak of the 1939-45 war between 30 and 40 pairs bred, generally unsuccessfully, at very scattered points on the promontory from Kent-Sussex border in the west to Lade in the north-east. Four to six of these pair nested at widely separated sites on the Reserve, at least two being at the south-west edge of the Herring Gullery.

BLACK-HEADED GULL (*Larus ridibundus*).—In the past century, thousands had nested regularly at the Hoppen Pits, their eggs being taken in large quantities by local people (Ticehurst, 1909). After some fluctuations the colony there began to disperse to other areas. In 1930 *ca.* 50 pairs held a territory at the inland side of the present ternery. This new colony increased and spread until by 1940 it occupied the whole of the shingle between the ternery and the Herring Gullery

COMMON TERN (*Sterna hirundo*).—The species is long-established as a common breeder on Dungeness. Except for very high mortality amongst chicks in 1932, the colony in the present area enjoyed considerable success during the 1930s and by 1939 occupied an area nearly three-quarters of a mile along the shore, stretching inland for *ca.* 200 yards. There were a few nests within the territories of the Black-headed Gulls and Herring Gulls. Estimates of numbers for this time vary between 600 and 1000 breeding pairs. There was evidence in 1939 of the work of natural predators. Harrison (1953) records that " Many were found dead, some without heads, which was thought to be the work of ground vermin". In 1942, all the eggs of a hundred pairs then nesting disappeared—"it was thought by a raid on the territory by Black-headed Gulls and Herring Gulls". However, in 1944 the colony's complete failure to breed with any success was this time attributed by Mr. R. B. Burrowes, quoted by Harrison, "to the presence of Foxes (*Vulpes vulpes*) which had greatly increased during the war years".

LITTLE TERN (*Sterna albifrons*).—Up to ten pairs bred with the Common Terns, sometimes inside their territory but more often at its western edge.

OCCUPATION BY THE WAR DEPARTMENT

In 1940, the whole Reserve, together with adjacent areas of shingle and scrub, was requisitioned by the War Department as a practice ground for mortars and anti-tank weapons. An extensive railway system with cuttings, embankments and large bunkers was created throughout the territory of the Herring Gulls (Larus argentatus) and in part of the territory of the Black-headed Gulls (*Larus ridibundus*). Anti-tank guns were fired from the edge of the gullery, the low-trajectory shells crossing the birds' breeding-ground. Each day, at the commencement of the practice shoot, the Herring Gulls left their nests for some rough fields near-by, returning immediately firing ceased, generally at about 16.00 hours.

Despite the very considerable interference by men and machines and the great changes made to the ground surface, the Herring Gulls returned each year to breed in the same location. The Black-headed Gulls ceased to breed after 1943. Because of the absence of a warden and a war-time food shortage, egg-collecting by humans was rife, continuing after the war until 1952. On one occasion in May 1941, the writer counted *ca.* 300 Herring Gulls' eggs, mostly c/1 and c/2, and on a visit a week later every one was gone. Some terns' eggs did not fall to human predators because of the greater difficulty involved in finding them.

A new mortar range was opened in the autumn of 1953 and covers almost all of the territory of the Herring Gulls.

RENEWAL OF PROTECTION

The effort to rehabilitate the Reserve was begun in April 1952 with the appointment of the writer as warden. The first object was to prevent human intrusion (egg-stealing was by that year almost a local custom) and then to obtain an indication of the general ecology and the need for any intervention to correct the prevailing predator/prey relationship. There had been no warden and little sustained observation on the Reserve for twelve years. Following reports of surveys by Mr. I. J. Ferguson-Lees in 1949 and Mr. R. A. W. Reynolds in 1951, it was considered that human predation was the most important controlling factor. Mr. R. B. Burrowes, joint-owner with the R.S.P.B. of the Walkers' Outlands area of the Reserve, expressed a strong opinion, however, that the new Fox population would be the ultimate factor in deciding whether successful breeding of ground-nesting birds would once more be possible.

Egg-stealing by human intruders was stopped at the outset of the 1952 season and it was soon apparent that the balance between natural predators (Carrion Crows, *Corvus corone,* and Foxes were then the most obvious) and prey (eggs and chicks of terns and gulls) was weighted heavily against the latter.

Declining vitality of the Herring Gulls. Despite the cessation of egg-taking by humans, the decline in the Herring Gull population continued between 1952 and 1955 (Table I). No young had been raised in the colony from the early war years until 1953 when only five young fledged. An indication of the birds' old age was their diminishing egg output: by 1955, with the weather exceptionally dry and warm, not more than three-quarters of the colony laid any eggs at all. Of some clutches protected with wire-netting enclosures in that year (see below), one c/1 was not added to during the incubation-period and only 18 clutches, all of one egg and all soon lost, were found in addition to the protected nests; thus very few replacements were laid. The colony was subjected to disturbance by mortar-firing but not nearly on the scale suffered by the birds during the war.

Protection of gulls' nests with wire-netting fences. Low fences around nests were first suggested, in 1953, by P. E. Brown, Secretary of the R.S.P.B., principally as an experiemental measure to protect terns' eggs from their then unknown predator. Some nests of Herring Gulls, Common Gulls and Black-headed Gulls were also enclosed in order to study their effect against known predators in the gullery—Foxes, Hedgehogs (*Erinaceus europaeus*) and Carrion Crows. At first, half-inch mesh wire-netting, two feet high, was used to form a 50-yard enclosure around one nest and occasionally two nests with eggs when these were close together. They were successful in protecting eggs when unenclosed clutches near-by were being robbed and later it was proved that fences only one foot high, of three-quarter inch mesh netting and of as small a perimeter of 12 yards were equally effective. Nests were enclosed very quickly, when they contained freshly laid eggs. The birds appeared to take little notice of the netting, flying back into the enclosure to cover the eggs as soon as the warden left. In the seasons 1953-55, twenty nests of three gull species were enclosed, causing the desertion of only one Herring Gull c/1.

Hatching occurred in all except one of these 19 incubated clutches. The fate of the chicks varied with the incidence of nocturnal predation, which increased in 1954 and 1955, after the local rabbits were killed off by myxomatosis. In 1953, one Common Gull brood of two hatched within an enclosure and one young fledged, the other chick dying. The two enclosed broods of Herring Gull chicks disappeared on the night of 11th/12th June when all the chicks then present in the colony were also lost. No holes were found under this fence.

In 1954, one Common Gull nest was fenced off with one-foot high netting. Two chicks and an infertile egg disappeared at night. Two Herring Gull c/3s were enclosed separately. One brood of three young were kept within their fence until they were 3½ weeks old. Of the other clutch, two young hatched, one dying. The second chick and the unhatched egg, but not the dead chick, disappeared, again with no holes under the netting. Weather during this period was very wet and cold: shelter tins, which were used freely by all chicks, were placed in all the enclosures.

Five pairs of Black-headed Gulls bred amongst the Common Terns in 1954. Four of their nests and three clutches of terns were enclosed with a 150-yard two-foot high fence of half-inch wire-netting and later separated by a fence roughly across the middle of the compound. After the erection of the fence, another Black-headed Gull's nest and two more terns' nests appeared within their respective compartments. All of these eggs hatched except for two single eggs of Common Tern which were not incubated. Eggs from two Black-headed Gulls' nests had been lost before the new nests were enclosed. There were frequent altercations between the two species but no predation by the gulls upon the terns.

In 1955, two nests of Common Gulls were fenced off separately. The first was enclosed with one-foot netting on 31st May when it was c/1 (c/2 next day and c/3 on 3rd June). The first chick of this nest did not hatch until 5th July after beginning to star on 29th June. The extraordinary long incubation period may have been due to disturbance by mortar firing on the range whose nearest point was *ca.* 300 yards. A 30-day incubation period was recorded from a nest in the same location in 1953. One chick from the second brood of three Common Gulls was found to have gone from its enclosure after a group of Common Gulls and Herring Gulls had been seen milling above the nest. The remaining two chicks were then released and their fate afterwards could not be ascertained.

In the Herring Gull colony, whose population had dropped from 60 pairs in 1954 to 45 in 1955, seven nests were enclosed individually that year. Six of these clutches remained safe whilst every other egg in unenclosed nests were lost to predators. The first brood hatched on 20th/21st June in a two-foot high enclosure at the base of a large pole which was the regular perch of a pair of Carrion Crows that it had not proved possible to trap. All three chicks were gone at midday on 22nd June, there being no hole under the netting. In another enclosure, three one-week old chicks disappearded at night. Two shallow scrapes, *ca.* 2 feet long were found in the shingle, leading up to the wall of the one-foot high netting but not passing under it. After this event, chicks were released from other enclosures and soon disappeared. None fledged.

PREDATION

CARRION CROW (*Corvus corone*).

Except for the winter and in spring and autumn migration periods when continental birds were in the area, the Carrion Crow was a rare bird on the Romney and Walland Marshes (Ticehurst, 1909) until the first pair bred near Brookland in 1919. The species was not seen amongst the gull and tern colonies in the 1930s. But then, with no natural enemy and with very little attempt at their control by humans, the crows soon assumed a dominant status on the promontory. In 1952, eleven pairs were found to be breeding on the 1,200 acres (mostly shingle) of the Reserve and this population density was certainly higher in other areas of the Marsh where nesting sites were more plentiful. In the shingle and scrub areas, crows found it necessary to build nests in gorse bushes and sallows, sometimes only 4-5 feet from the ground. Nests were also built in ruined cottages and regularly on the arms of telegraph poles in three locations—one in the middle of the ternery.

Carrion Crows versus Herring Gulls. In the first season of renewed watching (1952), it was noticed that four crows began to forage in the gullery as soon as the gulls began nest-building, on 15th April. The first Herring Gulls' eggs (2 x c/1) were not seen until 5th May although many completed nests had been found during the previous week, when pursuits of crows by gulls had begun. Throughout the breeding-season, the average number of crows present, each day, was eight; sometimes there were up to eleven. The rate of predation and replacement laying of eggs in 1952 is indicated by the following:—

Breeding pairs	84
Fully-made nests	271
Nests seen with eggs	194
Highest number of eggs seen on one day	70
Clutches of three (short-lived)	10
Opened and broken egg-shells found	90
Young hatched	0

Most eggs remained no longer than 1-4 days. In the last quarter of the season many eggs were laid on bare shingle, a scrappy nest being built around them afterwards. The rate of predation is also shown by the record of the nest in which the most replacements were laid:—Building finished 5th May; first egg found and marked, 14th; 1 new egg, 17th; empty, 18th; 1 egg, 20th; 1 new egg, 24th; still there, 25th; 1 new egg, 26th; empty, 28th; 1 egg, 30th; 1 new egg, 1st June; still present, 2nd; empty, 3rd; 1 egg, 9th; empty, 10th; 1 egg, 11th; empty, 13th.

Frequent checks at first and last light showed that many eggs were being lost in the daytime and, on a few occasions, during the night. Continuous observation showed that the only diurnal predators near the gulls' nests were the Carrion Crows. The technique used by pairs of crows to cause the sitting gull to leave the nest was:—one crow would walk around the nest at 3-5 yards distance and occasionally make short, provocative flights at the sitter whilst the second crow stood on the shingle *ca.* 50 yards away. The second gull at this time would usually be flying around above the nest, making dives at either crow. Eventually the sitting gull would leave the nest in pursuit of its attacker, whereupon the second crow would fly to the nest, then away, low. On none of the many occasions when a crow was seen flying away from a gull's nest was it seen to be carrying an egg and the bill was always closed. The nearest I got to establishing positively that crows removed Herring Gulls' eggs from the nest was on three occasions similar to the following incident. After a nest had been checked as containing an egg, the gull was watched back on to it and kept under continuous observation. Two crows arrived, one of which went to the nest after the sitting gull had left in pursuit of the other crow, then flew away, low. An immediate inspection of the nest showed it to be empty.

On 11th May 1952, a whole Herring Gull's egg was found three-quarters buried in a patch of lichen with the large end showing and closely resembling the large, spotted stones with which this lichen patch was strewn. The egg was fairly tightly embedded and there were no particles of loose earth or lichen to indicate that a hole had been excavated. The egg, on removal, showed that it was one marked by the writer two days previously in a nest *ca.* 50 yards distant. One of the railway cuttings of the old anti-tank range, with a 4ft. veritcal wooden side, ran between the nest and the point at which the egg had been buried.

One, and sometimes two crows together, were observed pecking into the shingle in the gullery area, frequently lifting up their heads in " drinking " motions. Having marked the spot on one of these occasions, the warden found a Herring Gull's egg buried in small shingle, with only a half-inch opened part showing. The broken edges of the shell were moist and the egg was nearly full. A small, shallow scrape in the shingle at the side of the egg was noticed. A wooden box was then placed over the egg and two hours later a pair of crows were observed on the box and also closely inspecting the shingle around it. Two birds were again at the box early the following morning and one was seen again there the following day.

On two other occasions when the spot where crows had been pecking into the shingle was discovered, an empty egg-shell, still containing a little moist albumen, was found alongside a small hole in the shingle. Of the ninety opened or broken shells found in 1952, most were by the side of, or near, these " egg-cup " holes. There was no concentration of such burying-places, rather were they scattered throughout the gullery, and earlier marking of eggs in the nest was useful in showing the egg-shells in or by egg-cup holes were 50 to 400 yards from the nests from which they had been taken. One other whole egg was found partly buried in bare shingle in 1952. Except that its colouration blended well with the shingle, it was not well hidden and could be seen to be lying on its side.

On 20th June 1953, I. St. G. Light and I, in a hide in the centre of the gullery, observed a crow to fly *ca.* 400 yards from a gorse patch and alight on the shingle without having deviated from its straight course. It began to peck into the shingle, holding its head up in drinking motions and, after 1½ minutes, flew off. Both observers went to the spot, where I. St. G. L. discovered an almost completely buried egg, opened at the top and still with half the contents, which were not fresh. That the crow had pre-knowledge of the egg's burying place seemed apparent from the bird having flown straight to the spot and begun to eat without first having searched around.

In 1952 and 1953, Rabbits (*Oryctolagus cuniculus*) had made many small holes, three to four inches deep, at the foot of grass tufts throughout the gullery. On 20th June 1953, on the supposition that these ready-made egg-cup holes might have been used by predators for egg-burying, I dug at the foot of many hundreds of grass tufts in the gullery and eventually discovered a whole Herring Gull's egg buried half an inch below the surface in small shingle. As in the other two cases, the shell of this egg was intact.

On 15th June 1952, a crow, after being pursued by a gull, alighted on the shingle and began to make choking motions—the head well up and then jerking with the bill close to the ground; there was a very large and prominent bulge in the bird's throat. The Herring Gull again attacked and the crow flew off, only to return, after about one minute, to the same place, where it began to peck into the shingle. When the gull had again driven the crow away, I searched the spot but could still find nothing.

The unsolved problem of egg-burying. The foregoing observations would have been complete had a crow been seen to carry away a Herring Gull's egg from the nest and then to bury it. In view of the several recorded instances of crows carrying large eggs with the lower mandible inserted into the shell (e.g. Sage, 1953), it is surprising that this behaviour was not seen at Dungeness. It was found impossible to pass a whole Herring Gull's egg through the gape of a freshly-killed crow. The possibility of an egg being carried between the bird's thighs, in the way that Woodcock (*Scolopax rusticola*) sometimes carry their young, was considered but a crow was never seen flying away from a gull's nest with its legs other than in the fully retracted position. Since egg-carrying was not witnessed, it might be supposed that the crows did not take the eggs, but there was evidence that single eggs disappeared when crows were the only predators observed.

A convenient solution to part of this problem would be that some eggs were removed and cached, during a period of surplus, by other predators, only to be discovered later by the crows and eaten *in situ.* The burying of gull's eggs by Foxes, in scattered positions around a nest, is known (Tinbergen, 1953) but the present case would require the Dungeness Foxes to be often in the gullery in daytime: the warden, living at the edge of the gullery, could not fail to hear the clamour caused by a Fox amongst the gulls in daylight. If, which would be more probable, Foxes removed and buried the eggs at night, then crows could not be aware of their burial places except by thorough searching of the shingle for those eggs not completely hidden under the surface.

After 1952, opportunity to gain more information on this question was greatly lessened by the large scale reduction of the crow population, the smaller egg output of the diminishing Herring Gull colony and the increased activities of nocturnal predators.

A buried egg *in situ* is shown on plate 18 (upper).

Other predatory behaviour of the Carrion Crow. On many different occasions, a single crow or a pair was observed to make a series of short, vertical up-and-down flights to between ten and fifteen feet; this behaviour seemed to be connected with attempted predation. Some instances were:— (1) a pair performing on either side of an incubating Herring Gull. (2) A single crow, followed up and down in its flight by an agitated Meadow Pipit (*Anthus pratensis*). (3) One, of two standing on the shingle, began a series of *ca.* 10 up-and-down flights. A Hare (*Lepus europaeus*) was near-by and when it made a dash at the performing crow, the other crow was seen to fly at a half-grown leveret, jabbing it with its bill. A battle between these three adult contestants lasted on and off for an hour and was broken off only when the leveret found shelter under a broom bush. At the same position on the following day a pair of crows were attacking a lone leveret which, despite its spirited rushes at the bird, was three times lifted off the ground in the bird's bill, to a height of about three feet. This fight ended with the headlong arrival of an adult Hare. The crows twice later returned, one of them jabbing all over the flat broom bush with its bill and breaking off a few small branches. A second short battle was seen here on the next day and twice again within the next three weeks. (4) A pair of crows pursued three fledgling Wheatears (*Oenanthe oenanthe*) which took cover under a prostrate broom bush. Vertical flights began; the Wheatears broke cover and were unsuccessfully pursued by one of the crows. (5) A group of 11 crows were around three dead ("myxomatosed") Rabbits. One was making short, vertical flights, each time dropping a small object like a stone which it carried up in its claws. (6) Vertical flights at a Common Gull's nest developed into a battle between two crows and the gulls. Later, the freshly broken egg-shells of the gulls c/3 were found scattered near the nest.

Carrion Crows in the ternery. Checks at first and last light showed that only a few eggs were being lost in the daytime. The most obvious diurnal predators were the 1-4 Carrion Crows in the ternery neighbourhood on most days. They were always readily attacked by the terns when they ventured within their territory. One case of a crow eating a tern's egg at the nest was seen in 1952. One was seen to fly off with what appeared to be a tern's egg in its bill, in 1953, and one egg was considered most probably to have been taken by a crow in 1955. The one egg shell found which was known certainly to have been eaten by a crow was considerably broken and had a small hole in the side opposite the main opening. Others opened in a similar manner were found near nest-scrapes along the shore bank but shells with these jagged openings were very few. Two opened shells were found half-buried in earthy shingle in the ternery in 1952. On 21st June of the following season another opened shell was found in an "egg-cup" hole where a small patch of lichen had been turned over and a very similar case was seen on 14th June 1954.

Action against Carrion Crows. Evidence for the need to reduce the abnormal crow population having been reasonably established, a conventional crow trap, with a live decoy, was operated in March 1953 and was immediately effective. A second crow trap was built at the edge of the gullery early in 1954 and six to eight large potter traps, baited only with hens' eggs and dead, day-old chicks, also caught good numbers inside the gullery. The numbers of full-grown Carrion Crows destroyed in each early spring were: 1953—

57, 1954—62, 1955—18. The resulting diminution of pairs breeding on the Reserve is shown in Table I. The unexpectedly high number of birds trapped—males and females in about equal proportion—probably included some migrants in 1953 but the figures are indicative of the high population density not only of the Reserve but of its neighbouring areas.

Apparent result of action against Carrion Crows. Following the 1953 trapping period, the number of crows in the gullery was between one and four and these not throughout the day, as in the previous year. Only very few opened gull's eggs were found and these again were by or near " egg-cup " holes. Twenty days after laying began in the 1953 season, 112 Herring Gulls' eggs were counted, including 28 x c/3, and 70 eggs were known to have been lost. Thus, most eggs remained safe for a longer period than in 1952, when many more crows foraged in the gullery. Further, only *ca.* 50 replacement clutches were laid (110+ in 1952); birds did not lay again after having retained their eggs/young for 3-4½ weeks. By 11th June, 23 chicks had hatched and many eggs were chipping. The next morning, however, all the chicks, none more than a week old, had disappeared and much-broken shells were found in eight nests. This was due to certain other predators (see later). Nocturnal predation of eggs and chicks continued every night after this date.

ROOK (*Corvus frugilegus*).

The nearest rookery is at Lydd, *ca.* two miles to the north. It is the largest colony on the marsh, with 242 nests in 1948, and 289 in 1949 (Harrison, 1953). Rooks did not forage in the gullery prior to the annual arrival of the post-breeding flock, usually about 1st May; in preceding weeks a large group of family parties fed chiefly around the farms near-by. On most days in June, *ca.* 200 adults and young birds foraged in a loose group over much of the shingle area, being principally occupied in probing at the base of plant-tufts and turning over lichen. When they were in the gullery, their presence seldom evoked attacks from the gulls, even when they were foraging within 2-3 feet of a brooding bird. It was noticeable that the Rooks fed near the ternery but not actually within the terns' breeding-area.

At one time five Rooks were perched on the wire-netting enclosing a Common Gull's nest and three were probing at plants inside the enclosure, the sitting gull making no demonstration. It was noted that, after the arrival of the Rooks, shells of previously eaten Herring Gulls' eggs would be most often found broken into very small pieces. Two Rooks were caught in potter traps baited with hens' eggs. The birds were closely watched but no act suggesting predation of gulls or terns was noted. In 1955, a small group of Rooks put in only a brief appearance in the gullery on 8th June. Throughout the month of June the flock was engaged in foraging in the rough grass of the outlands, where, because of good weather and the absence of Rabbits, grasses and other hitherto short vegetation was now better developed and held an abundance of insect food.

MAGPIE (*Pica pica*).

The history of the local increase in this species is similar to that of the Carrion Crow. Seventeen pairs bred on the Reserve in 1952 with a much higher density on the Marsh proper. Many nests on the Reserve were in thick gorse bushes and were frequently undomed, but unpractical and unnecessary roofs for these nests were constructed from the headless stems of teazle, up to 4 and 5 feet in lenght. In many cases, easy discovery of these nests was due to the presence of a teazle roof on top of a gorse bush. All the nests were necessarily very low, the lowest recorded being only eighteen inches from the ground to the bottom of the cup.

In the gullery. From two to four Magpies were present most days and appeared to find it especially necessary to walk amongst small roosts of immature and non-breeding gulls and also around incubating birds. Usually their presence was not resented by the gulls and half-hearted pursuits were witnessed on only a few occasions. No act of predation upon the gulls was observed.

In the ternery. In 1952 and 1953, before their decline in numbers (Table I), from one to three Magpies were recorded occasionally in the ternery during each day. Their foraging in in the open shingle areas occurs throughout the year and is not increased in the ternery during that colony's breeding-season. It was, however, noted that Magpies generally flew lower, about one foot above the shingle, when in the territory of breeding terns and gulls. When attacked by terns, they stood their ground with much more determination than the crows. No indication of predation by Magpies in the ternery was obtained.

GULLS IN THE TERNERY.

At least in the daytime, adult Herring Gulls from the colony near-by passed only infrequently across the ternery on their way to the shore. Immature birds of this species and of Great Black-backed Gulls (*Larus marinus*) and Lesser Black-backed Gulls passed over more often, however, and each time were attacked by the terns with such spirit that it seemed the gulls were only too glad to be clear of the area. Nearer the shore section of the ternery, young gulls were observed on about 25 occasions in four seasons trying determinedly to get to ground. There were no more than six instances of a gull, on the ground in the ternery, being attacked by terns. The successful and reasonably harmonious breeding side-by-side of a few Black-headed Gulls and Common Terns has been referred to. No gull was seen at a tern's nest.

HERON (*Ardea cinerea*).

One, heard calling when circling low over the gullery about one hour after dark on 19th June 1952 and similarly on 12th June 1953, caused extreme alarm amongst the gulls. One to three Herons were seen on eight occasions in daylight, circling above the gullery and trying to land there but apparently being prevented from doing so by spirited attacks from the gulls, most of whom were milling around their territory in the greatest panic ever observed there.

LITTLE OWL (*Athene noctua*).

One was heard calling in the ternery on three nights in May 1953. On 8th June the remains of two adult Common Terns were found in an outbuilding behind the ruined bungalow in which a pair of Little Owls were nesting. This was about three-quarters of a mile from the ternery. In both cases, the wings were intact and still attached to the sternum, which was picked clean. On 13th June of the same year, the remains of another Common Tern, one wing with a little flesh on the humerus, were discovered by the side of a broom bush 400 yards from the ruined bungalow and on the side of the Dengemarsh Sewer distant from the ternery.

GRASS SNAKE (*Tropidonotus natrix*).

From six to eight may generally be found in the summer around the Hoppen Pits about a mile and a half from the ternery. One was found alive on the shingle at the ternery's edge in June 1953. This was the only occurence of a snake in the completely dry areas of the Reserve.

HEDGEHOG (*Erinaceus europaeus*).

During the first season of resumed watching (1952), shells of terns' eggs were found five days after the first eggs were seen on 20th May. In 1953, first clutches remained safe for two weeks and then began quickly to suffer predation at night. Most shells were lying near or by the side of nest-scrapes and had a half-inch long, rather smooth-edged opening on the long side. No indication as to the identity of the predator responsible for the destruction of most of the terns' eggs was obtained until the 1954 season, when potter traps with hens' eggs as bait were set in the ternery. The loss of eggs at night had not begun until 27th May (eight days after laying started) and the first trap was set on the following day. Another was set at dusk on 4th June and next morning contained a live Hedgehog. For the next eighteen days no losses were discovered until a c/3 was eaten over-night. Two additional potter traps were set in the ternery and these trapped two more Hedgehogs at night.

In 1954 there had been no losses of eggs enclosed in wire-netting circles and, to test their efficiency against Hedgehogs, one of the trapped animals was kept in captivity for four days. It was enclosed in a twelve-yard circle of half-inch wire-netting one foot high, the bottom edge being buried 2-3 inches in the shingle. Outside this fence, a second one, two feet high, was erected as a safety measure. The Hedgehog was observed making many attempts to climb the one-foot wall, but it could not do so. It ate hens' eggs when the shells were broken but it did not eat whole ones.

The following points suggest that Hedgehogs may have been the main predators in the ternery in 1952-54:—

(1) Very few eggs were lost in the day-time.

(2) Most sucked eggs were found near nest-scrapes.

(3) The predator was one against which the terns had no defence.

(4) Eggs were taken near the low enclosures whilst those inside remained safe.

(5) A captured Hedgehog was kept for four days inside a circle of wire-netting one foot high which it was seen to be unable to climb. The netting was dug 2-3 inches into the shingle and the animal made no attempt to dig under it.

(6) The holes in the sucked egg-shells were "pushed-in" i.e., they lacked the jagged edges usual in eggs eaten by crows.

(7) A Hedgehog's snout was found to fit the holes in the terns' egg shells.

(8) The shingle near the shore, with its sparse vegetation and lichen patches, seemed to be an unlikely foraging ground for these nocturnal animals, unless they were taking the eggs.

(9) In the three seasons 1952-54, eggs had not begun to be taken until about a week after laying began; this appeared to indicate that the predator was not regularly hunting in the ternery area.

(10) Hedgehogs were caught in traps baited with egg only.

Since almost all unprotected clutches of terns' eggs were being lost, it is of some significance that most single "dropped" (unincubated) eggs remained intact throughout the 1952-54 breeding-season; it may supposed that it was the presence of the sitting bird which led to the discovery of eggs by nocturnal predators. In this connexion and bearing in mind the species' better camouflage on the shingle, it should be mentioned that eggs of the half-dozen pairs of Ringed Plovers (*Charadrius hiaticula*) that breed regularly in the ternery, usually remain safe.

A Hedgehog was trapped in the gullery in June 1952 and one in the same month in 1954.

In the 1955 season, anti-Hedgehog measures took the form of increased use of wire-netting fences around nests and the use of eight potter traps. No Hedgehogs were trapped and because the few shells of eaten eggs which were found were much-broken, it was considered probable that they were not present on the shingle areas that year. Further, only one was seen in the Outlands. It was considered that these animals had been destroyed by Foxes in the previous Rabbit-free winter.

By 30th June 1955, the 35 pairs of Common Terns were progressing towards a high degree of breeding success, only 1 x e/2 and 3 x c/1 being recorded as lost. This was due most probably to the increased use of wire-netting fences.

STOAT (*Mustela erminea*) and WEASEL (*Mustela nivalis*).

The former species is more often seen in recent years but neither is numerous. The presence of a Stoat or Weasel in the gullery was suggested by potter traps being " sprung " on four occasions at night and being found baitless next morning, with a few light-brown hairs on the netting where the animal had squeezed its way out past the door of the trap. Two "inverted bucket " traps were used without success. This type of trap is a bottomless bucket sunk into the shingle upside-down, the opening level with the ground. Bait of highly smelling eggs was lost after the first night but untouched thereafter.

BADGER (*Meles meles*).

A female was shot in a grass-lined set in an old Rabitt warren near the Reserve, in the early spring of 1955. Enquiries of local people show a hitherto complete ignorance of the presence of this species in the Dengemarsh area. Since farmers and the writer conduct a thorough search for Foxes' earths in the area, it may be supposed that the Badger's occurrence in 1955 was new in modern times, although it would seem strange that its appearance should follow the extinction of the Rabbit, on which it preys commonly. I have not seen one nor any sign of its activity in the area except for the tracks of one in snow, a half-mile from the Reserve, on 4th February 1956.

OTTER (*Lutra lutra*).

One is very occasionally recorded on Romney Marsh. In the vicinity of the Reserve, one was seen in the Dengemarsh Sewer in April and October 1953 and I heard one at the Hoppen Pits in October. The species is recorded as taking wild birds but not their eggs (Min. of Ag. and Fish., 1951).

BROWN RAT (*Rattus norvegicus*).

There were no reports nor signs of any rats on the Reserve between 1952 and 1955. Small numbers were occasionally known in the area of the Dengemarsh Sewer outfall in pre-war years when the few cottages and an inn (now in ruins) were occupied. Fishermen then living there took strong action against them in order to protect their nets.

FOX (*Vulpes vulpes*).

Before 1940, the Fox was viruallv unknown on the Dungeness promontory and its spread into the scrub and shingle areas is considered to be due to disturbance through the war-time occupation, by troops, of the woods and hills on the west and north of the Marsh and also to the virtual cessation of game-keepering and to the post-war cost of cartridges. The Foxes' ability to breed successfully in the wastelands would have been due to a large extent to the dense Rabbit population there and to a lack of disturbance by humans in some large areas of the Outlands scrub. The first large-scale shoots by local farmers at the end of the winter of 1952 killed about 30 Foxes on and in the neighbourhood of the Reserve. These shoots became an annual feature and were so successful that it was possible to kill only six over a wide area between February and May 1955. Myxomatosis appeared on the Reserve in November 1953 and by the end of March 1954 had effected an almost 100% kill, but it cannot be said that the absence of Rabbits was a natural cause of the diminution of the Fox population from that time onwards. Foxes shot in the winter of 1954/55, far from showing any signs of emaciation as a result of the loss of their main food supply, were well-nourished. Prey hunted more rigorously would have been Hedgehogs, Field Voles (*Microtus agrestis*) and stock from the extensive local chicken farms.

In 1952 and 1953, the presence of predators at night was indicated by the overnight disappearance of a small number of eggs, but in 1954 and 1955, after the advent of myxomatosis, almost all of the unprotected eggs and some protected chicks were lost after dark. In the spring and early summer of the first two years, a Fox was seen infrequently in the gullery at dawn and dusk, twice, at first light, carrying a Rabbit through the centre of the colony. In 1952, a dead adult Herring Gull was found with a wound in the side of the neck and this corpse was found decapitated next day.

Foxes and wire-netting fences in the ternery. Of the four seasons under review, the first three had demonstrated that Hedgehogs rather than Foxes were the controlling factor in the ternery. Wire-netting fences first used in 1953, had provided complete protection whilst most unenclosed eggs were being lost. As was the case with the gulls, the terns took almost no notice of the netting around their nests and because of this and as an extension of the experiment, one c/2 was surrounded with a one-foot high fence of only four yards perimeter. Apart from extra head-twisting during the first change-over of incubation duties, the birds showed no concern at the fence and the third egg was present next day.

In two previous seasons, clutches were enclosed when the eggs were found, but in 1955 a large fence of 300 yards perimeter, two feet high and of $\frac{3}{4}$-inch mesh wire-netting, was erected before the breeding-season around an area that experience had shown to be used regularly by several terns. On return to their breeding-site the terns appeared to take no notice of the netting and most of the first clutches were laid within this fence. Four clutches laid just outside were brought within the fold by the addition of a further 100 yards of netting. Twelve other clutches were wired off individually in small circles of netting one foot high. An eventual total of twenty clutches were laid inside the main enclosure. By their late dates, five of these clutches were probably repeats from birds that had lost their eggs elsewhere in the ternery, but the others were due to regular use of the same location in the ternery. An example of this was one clutch being in exactly the same position from which a successful brood was hatched in the previous year (1954) and where there had also been a nest in 1953. Thus in these three seasons, eggs were laid at the south side of a flat three-inch-wide stone which had been used by the writer to number the nest, the numbers from the two previous seasons still being present on its underside in 1955.

By 1st July 1955 the 35 pairs of Common Terns had *ca.* 30 chicks in enclosures, with other clutches chipping. At dawn next morning, after a wet night, a Fox was put up at the edge of the ternery, where it was found that all but five chicks and six clutches had disappeared from the main compound and young were also gone from two small enclosures. A large scrape, with the shingle thrown back about four feet, had been made under the netting of the main enclosure and there were three smaller scrapes at the netting, near-by. The gap under the netting was about five inches deep. These holes were later blocked and all the fence stakes liberally dosed with " Renardine ". This preparation, whose fumes are claimed to be repellant to Foxes and " vermin ", was used in the ternery and gullery each season but its efficacy must often have been nullified by wind and rain.

However, no further evidence of a predator was discovered until the morning of 6th July. A two-foot long scrape, 3-5 inches deep through lichen into the shingle was discovered at right angles to a small enclosure, stopping at the netting and not passing under it. This enclosure was only ten inches high. The two one-week old chicks were still safe and were found inside their shelter tin (an old ammunition tin with an entrance about three inches square). The following night was one of no wind and a full moon. Soon after dark, from a hide in the centre of the ternery, I saw a young Fox quartering the ground at speed. It approached some meat which I had placed within a small circle of netting as a lure but sheered off before coming within gunshot range. The animal was present throughout the night until dawn (02.15 hours) and its location in the gullery and ternery area could be told almost at any time by the alarm notes of the birds in whose territory it was.

There was no colonial alarm; it was, rather, extremely local and during the Fox's rounds of the colonies, alarm would be heard from a Common Tern, presently from a Little Tern, then Stone Curlew (*Burhinus oedicnemus*), Common Gull and Herring Gull in turn. Terns did not dive at the Fox and made no "machine-gun" attack notes. The Fox did not approach the wall of the main enclosure, near where the hide was, and these birds remained quiet even when the owner of a nest 100 yards away was circling and calling above the animal. Terns showed no alarm when a powerful aldis lamp was used in attempts to see the predator at work. A thorough check at dawn throughout the area showed, surprisingly, no losses from any of the ground breeding birds.

Two days after this event, another large scrape was discovered under the wall of the main fence, but since one large chick was found outside the fence, apparently having escaped under the hole, others may have got out also and the amount of loss could not be told. That evening, two hurricane lamps were placed in the ternery at dusk, in the hope of deterring any predator. Use of these lamps continued for the next seven nights, during which time no losses were recorded and no scrapes were made at the enclosures. On the morning of 15th July, however, although one lamp had been burning in the centre of the main compound, two scrapes, about six inches deep, were found under the netting and two chicks (out of four remaining) were missing, but none of the eggs had disappeared.

The main fence was then dismantled and on the night following its removal, five of the seven clutches of eggs it had enclosed, were lost.

Three Little Terns' nests were enclosed separately in one-foot high netting. One brood of two chicks was found dead in one enclosure which had a large scrape leading up to it and running about five inches deep beneath the netting. The chicks bore no signs of external injury. In another Little Tern's enclosure, at which there was no scrape, two of three very small chicks were found dead. A third brood was released.

Towards the end of the breeding-season it was learned that the scenting powers of vermin and the smell of ground nesting birds could be temporarily destroyed by the spraying of petrol mixed with heavy oil (Booth, 1954). There was no time to acquire these materials; paraffin, all that was then available, was sprayed around one small compound but two days later the two chicks had disappeared, there being no scrape under the netting.

With the object of studying the footprints of any predator that might appear on it, a belt of wet sand, 15 inches wide, was laid around a Common Tern's nest at a distance of 18 inches. The nest chosen for this experiment was a c/2 on a small tuft of sea-campion on bare shingle. The clutch was complete next day and these three eggs remained safe from 26th June (1953) until 8th/9th July. During this time almost all other eggs not enclosed in wire-netting were being lost. On the morning of 9th July rain from dawn ceased at about 06.00 hours and soon after it was discovered that the eggs had gone. The sand belt was pitted by the rain but some indistinct imprints about one inch across and ½ inch deep could be seen. A group of three foot-prints three to five inches apart were on the inside edge of the sand at one edge and a group of 4-5 were in the middle of the sand at the other. The number, size and position of the prints indicated that they may have been made by an avian predator (Carrion Crow or Magpie) rather than by a mammal. This experiment, which had been suggested by N. W. Orr, was repeated in the following year but was spoilt by frequent rain.

In 1955, the stuffed skin of a Common Tern was set on two infertile tern's eggs inside a large potter trap. The body of another Common Tern, found freshly dead, was used similarly in a second trap. There were, however, no results from these experiments (1955 was the year in which no signs of Hedgehogs were discovered in the shingle area).

TABLE I—BREEDING PAIRS ON DUNGENESS RESERVE, KENT, 1952-55

	1952	1953	1954	1955
Stone Curlew (*Burhinus oedicnemus*)	5	6 (7)	6	5-6
Lesser Black-backed Gull (*Larus fuscus*)	1	1	0	0
Herring Gull (*Larus argentatus*)	84	80	60	45
Black-headed Gull (*Larus ridibundus*)	2	2	7	0
Common Tern (*Sterna hirundo*)	26	40	30	35
Little Tern (*Sterna albifrons*)	c.7	8	15	12
Carrion Crow (*Corvus corone*)	11	5	4	2
Magpie (*Pica pica*)	9	17	5	4

TABLE II—PREDATION AND PROTECTION OF TERNS' EGGS, DUNGENESS RESERVE, KENT

	Common Tern (*Sterna hirundo*)				Little Tern (*Sterna albifrons*)			
	1952	1953	1954	1955	1952	1953	1954	1955
Breeding pairs	26	40	30	35	c.7	8	15	12
Clutches seen	69	74	33	42	6	9	17	9
Clutches enclosed	0	3	6	32	0	0	0	3
Clutches hatched	*ca.* 4	4	5	ca. 24	5	3-4	*ca.* 4	5

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SUMMARY

Colonies of gulls and terns (principally Herring Gulls, Black-headed Gulls and Common Terns) bred successfully on the shingle at the R.S.P.B.'s Dungeness Bird Reserve up to the outbreak of war in 1939. The Reserve was requisitioned by the War Department in 1940 and used as a mortar and anti-tank firing range. Between 1940 and 1952, when there was no warden, egg-stealing by humans took place on a grand scale and, by the time wardening was resumed in April 1952, the colonies were greatly depleted. The prevention of public access gave scope for the activities of natural predators whose populations had so increased in the war years as now to control successful breeding of the remaining gulls and terns. Predatory activities of Carrion Crows are detailed and their eating of Herring Gulls' eggs buried in the shingle is described. Crows were known to take eggs from gulls' nests but were not seen to carry them nor to bury them. The possibility that they, or some other predator did so, is discussed. The apparent effect of reducing the numbers of crows is shown by successful breeding in the gullery.

Mammalian predators which had destroyed most of the terns' eggs were eventually discovered to be Hedgehogs. The successful use of wire-netting fences around gulls' and terns' nests is demonstrated. Black-headed Gulls and Common Terns bred successfully in adjacent enclosures. Foxes arrived in the Reserve area in war-time and flourished. A large Rabbit population was destroyed by myxomatosis during 1954 and this event appeared to have repercussions upon the ternery and gullery at a time when some success was being achieved by the control of crows and Foxes and the protection of nests with wire-netting. Reference is made to the known presence and activities of other predators and also to some further experiments in protection and detection.

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FURTHER EXPERIMENTS WITH AN ARTIFICIAL NESTLING GAPE

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(Plates 19-20)

A method of sampling food brought by adult birds for their young in nest-boxes, by means of an artificial nestling gape inserted into the nest, has been described in an earlier paper (Betts, 1954). This necessitated using a special nest-box and a darkened hide, and a better method has now been devised whereby the artificial gape is used outside an ordinary nest-box, with a simple hessian hide to conceal the observer. Successful results have been obtained at many nests of titmice (*Parus* spp.) in the Breckland pine plantations of East Anglia.

A hide, with a perforated zinc window for observation, is erected beside the nest-box towards the end of the incubation-period. Perches are provided in front of the box, and a flap of material is pinned across the gap between the box and the hide (see plate 19). After the young have hatched, the parents are first accustomed to being delayed for a few seconds by a stick held across the entrance hole, while the food brought is recorded. The birds are rarely disturbed by this, and the artificial gape may be introduced as soon as they are used to the presence of the stick.

The artificial gape, illustrated in plate 19, is made as described previously (Betts, 1954), except that the rubber pipette bulb has been replaced by a baby's feeding bottle teat, which is stronger and perishes less quickly. The gape is mounted on nine-inch scissor-type forceps and, through a slit in the hide wall, the forceps are inserted behind the material flap between the hide and the box, in such a way that only the gape is visible to the adult bird approaching with food. The adult lands on the perch in front of the box, is prevented from entering by the stick held across the entrance hole, and is induced to feed the artificial gape (see plate 20). This is then immediately withdrawn to prevent the parent bird from retrieving the food which its "young" has grasped but failed to swallow. If the meal consists of only a few items the whole of it may be obtained, but if a large bundle of small items is brought only a portion can be grasped at one time. It is, however, often possible to withdraw the gape, remove the food, and return the gape quickly enough to collect the rest of the meal. The adult will not feed the artificial gape unless this simulates the begging responses of the young and the live young inside the box call. The young generally begin to call when the parent alights on the perch in front of the box, so it is essential that they are not disturbed in any way, as when frightened they remain silent.

The behaviour of the adult birds must be studied at all stages in the experiments. Sampling of nestling foods is always alternated with periods of observation at the nest to check that the use of the artificial gape does not disturb the normal feeding behaviour of the parent birds.

In 1954 and 1955 this artificial gape was successful in collecting samples of food brought to 13 broods of Great Tits (*Parus major*), 12 of Coal Tits (*P. ater*), 3 of Blue Tits (*P. caeruleus*) and 2 of Wrens (*Troglodytes troglodytes*). It is surprising that the same artificial gape was accepted by all four species, irrespective of differences in nestling gape colour and pattern, and of the size of their own nestlings at the time. At one Coal Tit's nest the artificial gape was fed by a Wren which was bringing food to the young titmice. This bird was not used to the gape, but accepted it and fed it without hesitation. Possibly the artificial gape provides a super-normal stimulus to the adult bird, as does, perhaps, the large gape of a young Cuckoo (*Cuculus canorus*). Tinbergen and Perdeck (1950), experimenting with the begging responses of young Herring Gulls (*Larus argentatus*), found that a model of the red patch of an adult's beak designed to give a greater contrast than the normal, produced a higher begging response in the young.

The study of the food of nestling titmice in pine woods is continuing and the results will be published later. Use of the artificial gape has confirmed, however, that there are differences in the size and species of foods of nestling Great Tits, Blue Tits and Coal Tits in pine woods as in oak woods (Betts, 1955). These results contrast with those of Tinbergen (1949), who found no difference in the diets of different species of tits in Dutch pine woods. The collection of food samples from Coal Tits has also demonstrated the inadequacy of direct observation, even at a range of nine inches, when the adult bird is bringing many different foods at one visit. Under such conditions only the largest items are seen and counted in a bundle of 20-200 small items; and even caterpillars, 10-15 mm. long, cannot be counted accurately when more than 4 or 5 are brought together. It is therefore necessary to obtain samples of the food, so that the items may be counted and identified accurately.

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SUMMARY

1. A description is given of a new method of using an

artificial nestling gape to collect samples of food from the parent bird, as it perches outside the nest-box.

2. The same artificial gape has been used at nests of 13 pairs of Great Tits, 12 of Coal Tits, 3 of Blue Tits and 2 of Wrens. It was accepted by the adults of all four species, irrespective of differences in their own nestlings.

3. Food samples collected at nests in pine woods confirmed that there are differences in the foods brought by Great, Blue and Coal Tits to their nestlings.

4. Use of the artificial gape demonstrated the inadequacy of food studies by observation when several items are brought together.

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OBITUARY

EDGAR P. CHANCE (1881-1955)

THE death of Mr. Edgar Chance occurred on 24th October 1955, at his home at Sandhurst, Berkshire, at the age of 74. He was the third son of Mr. A. M. Chance of Edgbaston, Birmingham, and was educated at Trinity College, Cambridge. He will be remembered for his intensive field study of the breeding-habits of the Cuckoo and the well organized experiments he conducted with characteristic energy and enthusiasm. Under his direction photographs and cinefilms were taken which proved that, contrary to the then generally accepted belief, the Cuckoos under observation laid their eggs while sitting on the nests of the fosterers. Mr. Chance wrote two books on his results, *The Cuckoo's Secret* (published in 1922) and *The Truth about the Cuckoo* (1940). He gave his collection of British-taken birds' eggs to the nation and the Cuckoos' eggs, including 87 laid by one Cuckoo in 5 seasons, can be seen in the British Museum (Natural History). G.C.

Th [illegible]
in 1947

SOME PHOTOGRAPHIC STUDIES OF WHITE-FRONTED AND LESSER WHITE-FRONTED GEESE

Photographed by J. V. Beer, C. T. Dalgety, Niall Rankin, P. O. Swanberg and Philip Wayre

(Plates 21-28)

There are two species of White-fronted Geese occurring in Britain and one of them is split into two rather well-marked races. The comparative difficulty of identifying geese in the field has meant that knowledge of the distribution of these forms has been confused. The problem of identification is largely that of being able to approach the geese closely enough, for at short distances nearly all individuals of the three forms are readily distinguishable.

The Lesser White-front (*Anser erythropus*) (plates 21-24) is only a vagrant in Britain, although the western end of its breeding-range is as close as Norwegian Lapland. At the time of publication of *The Handbook* only one British record seemed to be beyond reproach, but since 1945 the number of individuals identified has been increased to over forty.* There is no reason to believe that the species occurs any more commonly now than it did formerly, for the relative abundance of recent records can be explained by increasingly intensive observation of the goose flocks in which odd Lesser White-fronts are liable to occur. Thirty of these vagrants have accompained the large flocks of White-fronts (*A. a. albifrons*) frequenting the Severn Estuary at Slimbridge in Gloucestershire. Seven others have been found in flocks of Bean Geese (*A. arvensis*) (six in Kircudbright, one in Norfolk*). The occurrence of odd individuals of one species of goose in flocks of another species is general, and by no means restricted to closely-related species. The Lesser White-fronts in British goose flocks seem likely to have become attached to the "wrong" species during or soon after the breeding-season, perhaps particularly in the flightless period of the moult. The breeding range of *A. erythropus* is for the most part south of that of *A. albifrons* although there is an area of overlap in the forest tundra zone of Siberia. In Lapland *A. erythropus* is known as the Mountain Goose, and in the Siberian parts of its range it also frequents high ground, unlike *albifrons*. Similarly, in Lapland and farther east there is some overlap with *A. arvensis*.

The individual illustrated in plates 21 and 22 is not an "ideal" example of the Lesser White-front. The bright yellow orbital ring, which is perhaps the most striking single characteristic of the species, shows plainly enough, but the profile is not very typical. *A. erythropus* has a very small bill and a slight mane at the back of the head, and most individuals have a high-crowned appearance normally accentuated by the tendency for the white

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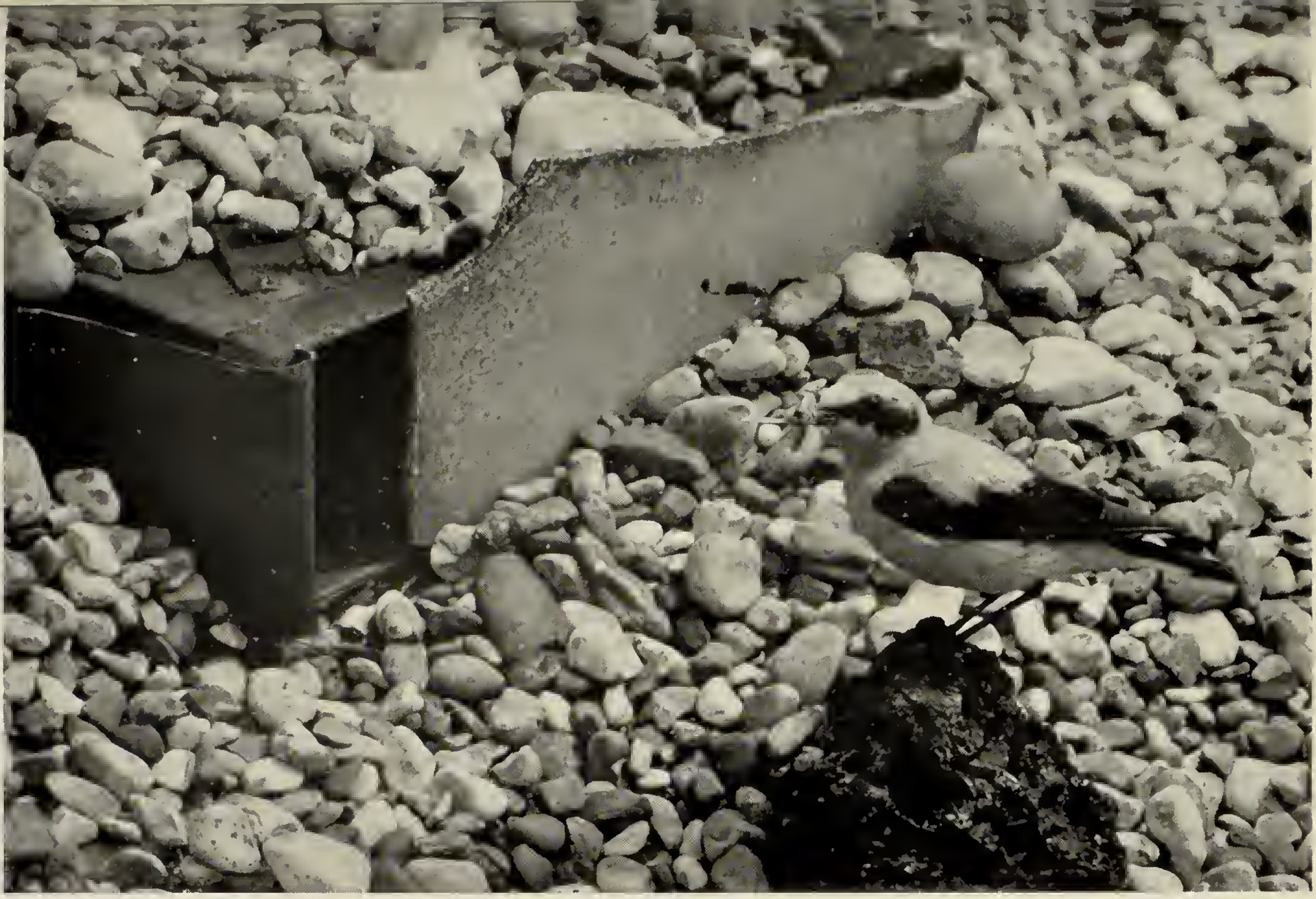
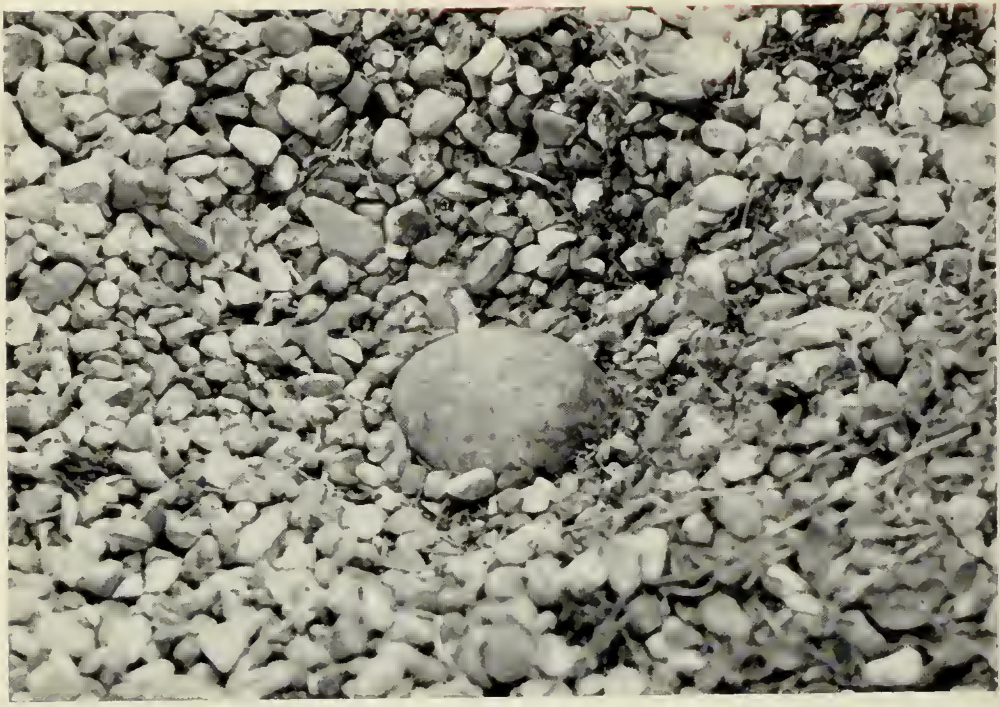
* For details of 1956 records see pages 227-230.—Eds.



Eric Hosking

MALE WHEATEAR (*Oenanthe oenanthe*) APPROACHING NEST-TIN: DUNGENESS, KENT
A number of these "nest-boxes" have been put in position on the Dungeness Bird Reserve by the Warden, H. E. Axell, and in 1955, for example, Wheatears occupied fifteen of them. They consist of discarded ammunition tins which are partly buried in the shingle with the open end covered in such a way as to leave a suitable-sized entrance-hole. A paper on work at Dungeness appears on pages 193-212.

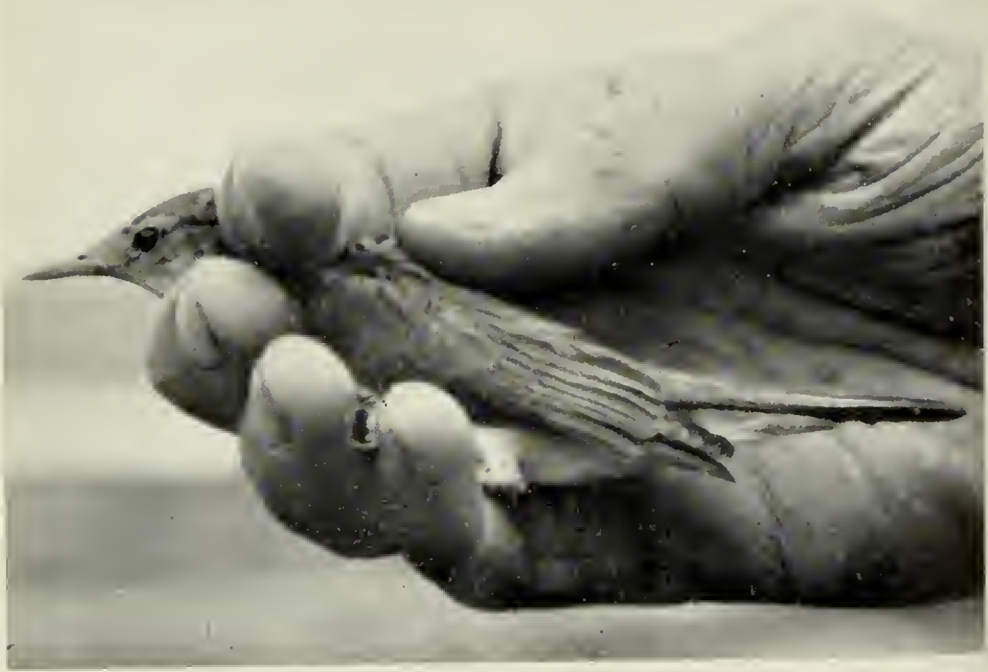
NATURAL HISTORY



Eric Hosking

Herring Gull's (*Larus argentatus*) egg partly buried in shingle: Dungeness, Kent

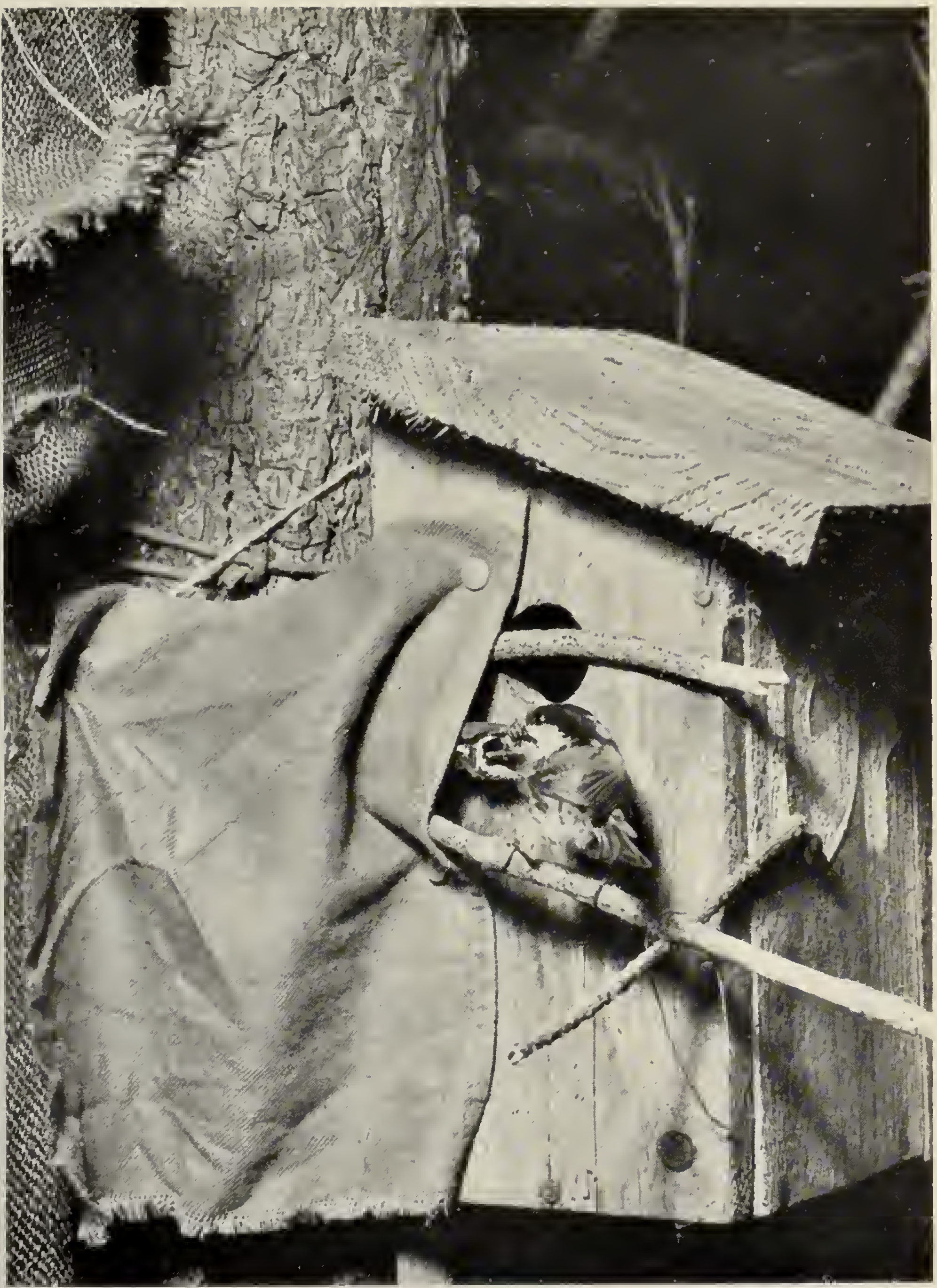
One of the unsolved problems of predation at Dungeness Bird Reserve has been the finding of buried Herring Gull's eggs (see pages 200-201). In this case some of the stones have been removed for photographic purposes.



Huw Jones

Melodious Warbler (*Hippolais polyglotta*): Bardsey Island, 20th August 1955

Note the heavy, pointed head, characteristic of the genus, and the unconspicuous edgings to the secondaries which perhaps never form a wing-patch such as is often found in the Icterine Warbler (*H. icterina*)—see pages 232-233 and compare vol. xlvii, plate 21.

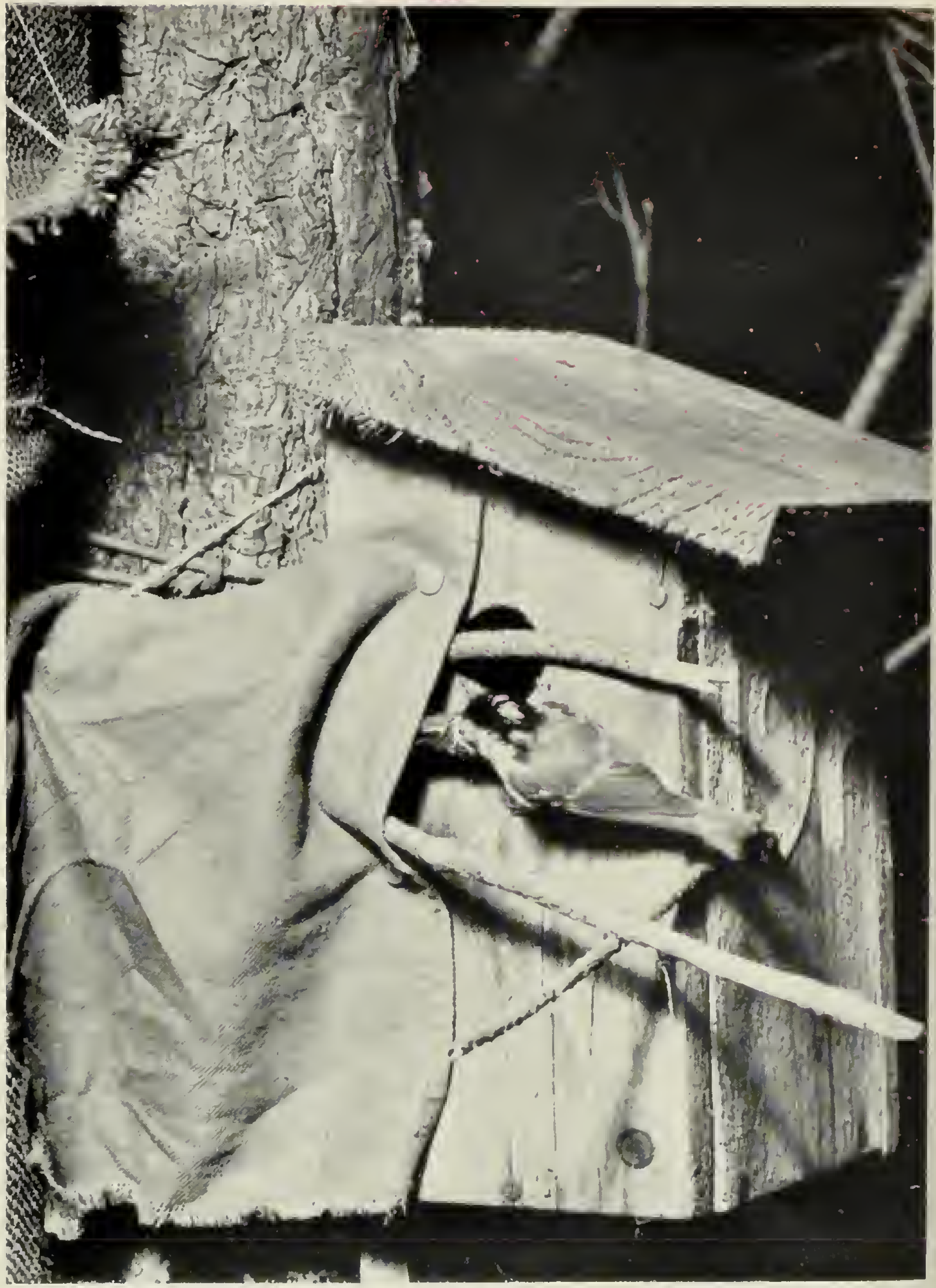


John Markham

COAL TIT (*Parus ater*) ABOUT TO FEED ARTIFICIAL NESTLING GAPE USED IN TAKING FOOD-SAMPLES FOR ANALYSIS

The observer's hide is on the left of the photograph and the gap between it and the nest-box is covered by a flap of material pinned across. When a sample of food is to be taken, the adult bird's entry to the box is delayed by a stick across the hole, as shown here, and the artificial gape is thrust behind the covering flap (see pages 213-215).

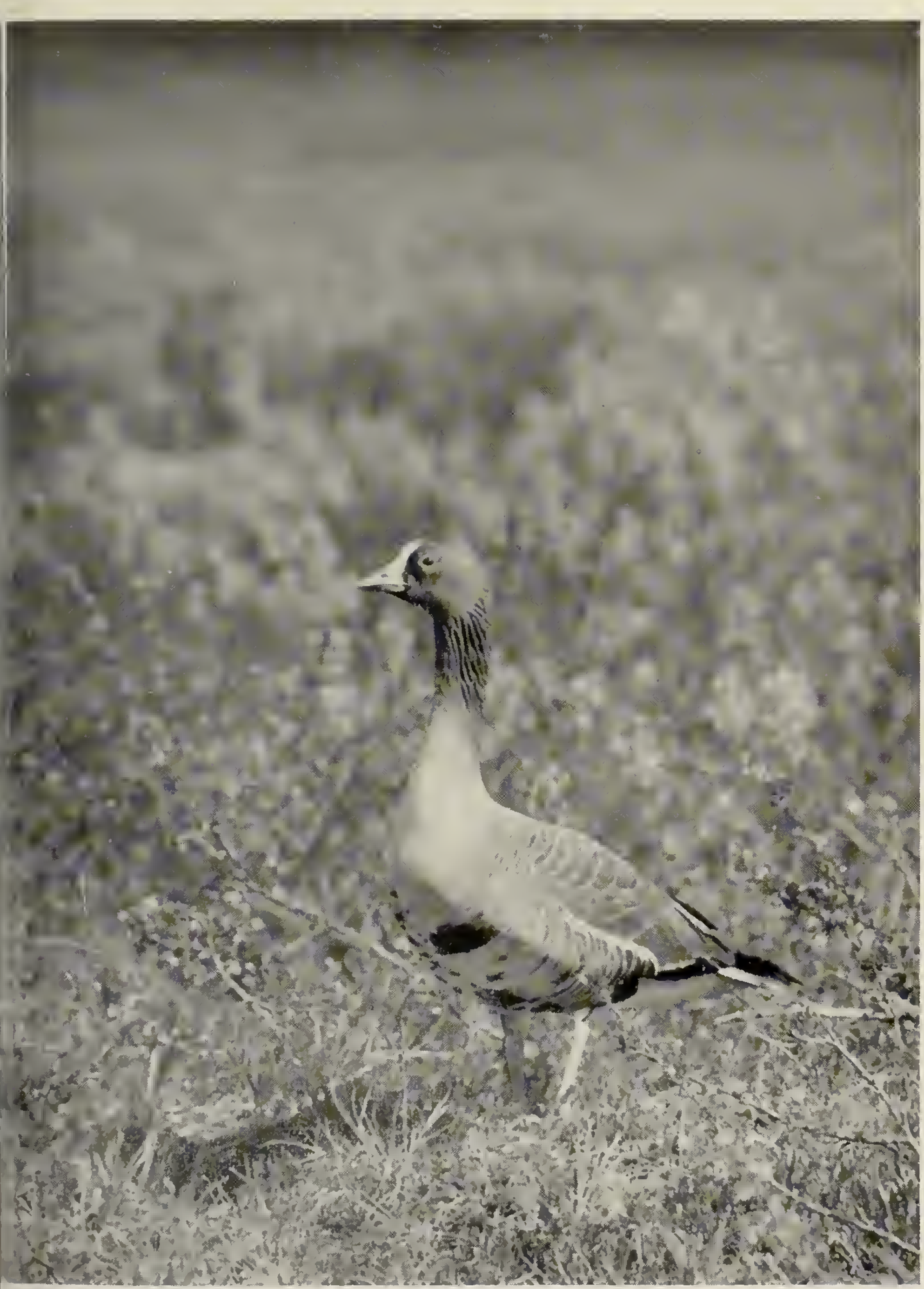
BRITISH MUSEUM NATURAL HISTORY Z



John Markham

COAL TIT (*Parus ater*) FEEDING ARTIFICIAL NESTLING GAPE USED IN TAKING FOOD-SAMPLES FOR ANALYSIS

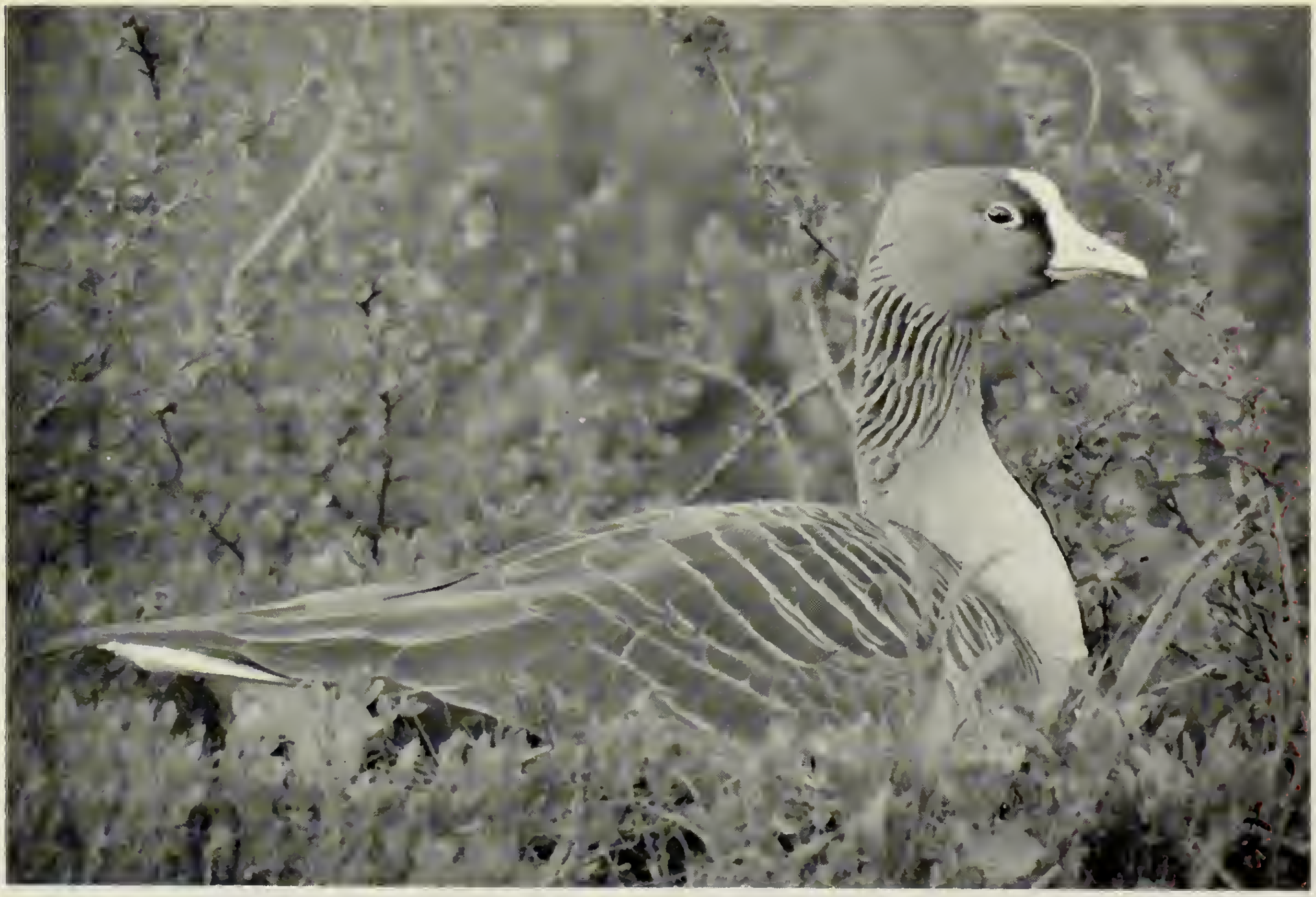
Another view showing the adult actually feeding the nestling. The gape is constructed of a baby's feeding-bottle teat, cut like a beak and lined with coloured rubber; the whole is then mounted on a pair of nine-inch forceps so that one of the points forms a tongue (see plate 19) which can close on the other to grip the food. The apparatus is thrust forward in such a way that only the coloured gape is visible (see pages 213-215).



P. O. Swanberg

ADULT LESSER WHITE-FRONTED GOOSE (*Anser erythropus*): LAPLAND
The yellow eye-ring and the high, white blaze on the forehead are clearly shown here, as is the small bill; compare the adult White-fronts (*A. albifrons*) in plates 26 and 27. However, in head-shape (see also plate 22) and in the rather heavy markings on the under-parts this is hardly a typical individual (see page 216).

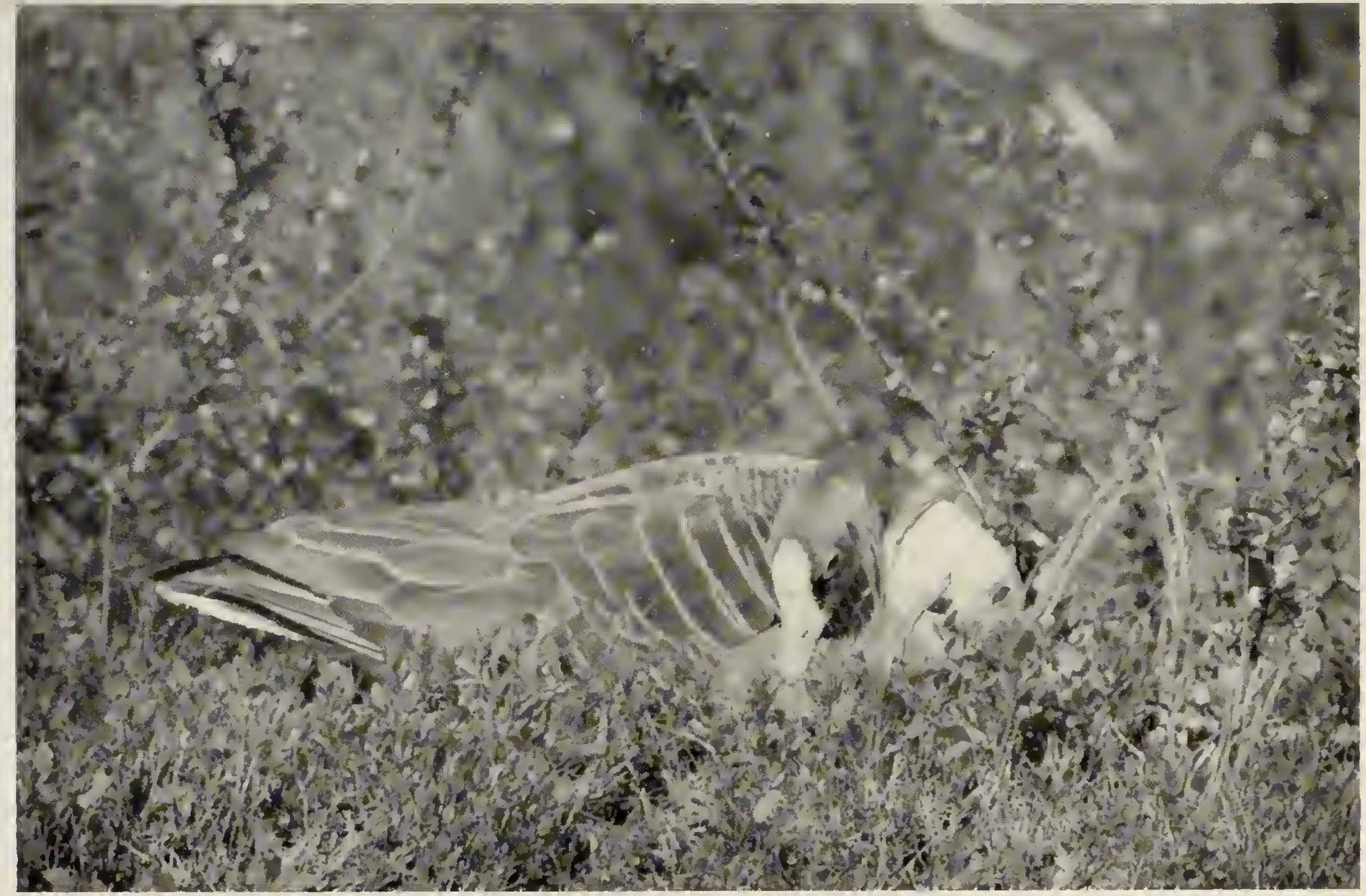
BRITISH MUSEUM NATURAL HISTORY



P. O. Swanberg

LESSER WHITE-FRONTED GOOSE (*Anser erythropus*) ON NEST: LAPLAND

The swollen, yellow eye-ring stands out clearly, but most Lesser White-fronts have a slight mane at the back of the head and a high-crowned appearance normally accentuated by a tendency for the white feathering to extend in a rather narrow band far onto the top of the head, a feature not brought out by this individual.



P. O. Swanberg

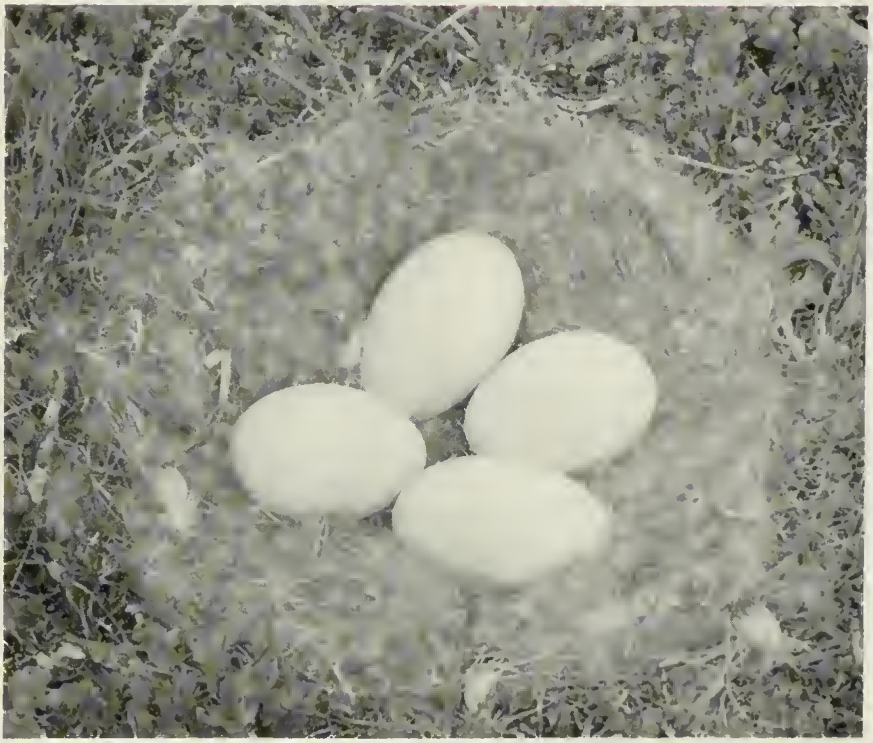
Lesser White-fronted Goose (*Anser erythropus*) on nest: Lapland
As with other geese, incubation is by the female alone and she is here seen re-arranging the nest-material. The white on the forehead extends well above the eye, in some individuals continuing even further as a narrow band (see page 217).

PLATE 24

NATURAL HISTO

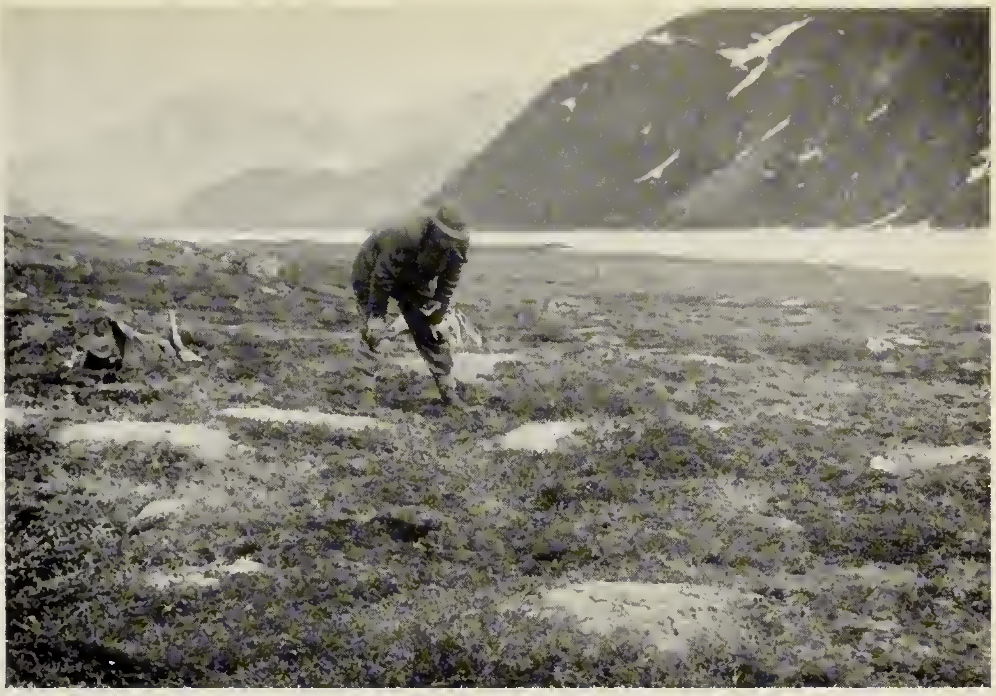
P. O. Swanberg

LESSER WHITE-FRONTED GEESE (*Anser erythropus*) IN FLIGHT



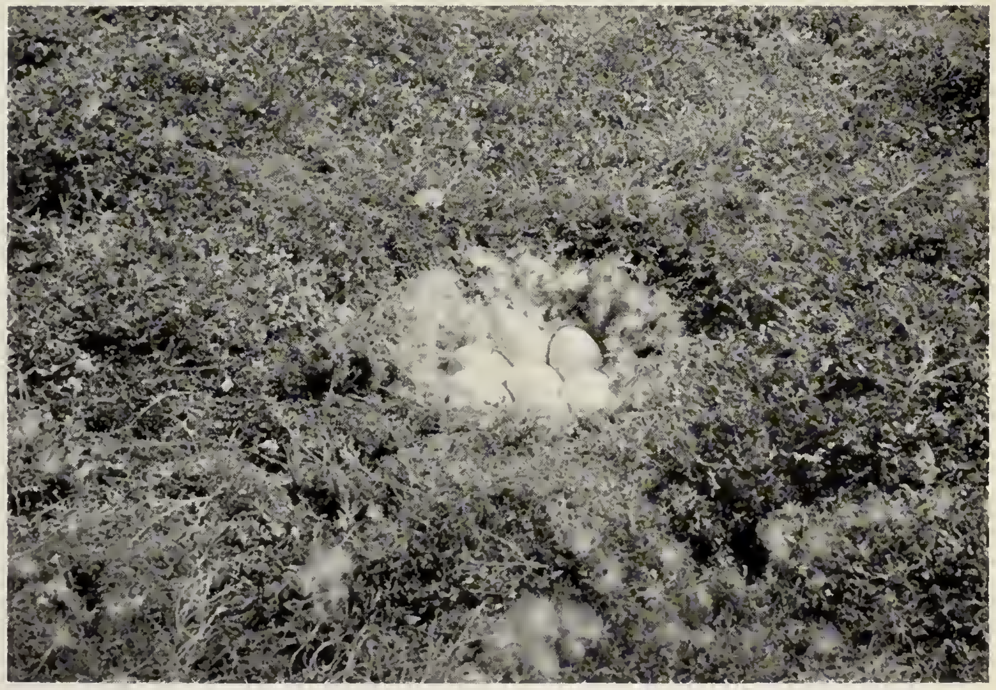
P. O. Swanberg

LESSER WHITE-FRONTED GOOSE (*Anser erythropus*), NEST AND EGGS: LAPLAND
The nest is usually a shallow depression lined with grasses or heather and the light-centred, grey down. In some of its range this species breeds in tundra country like the White-front (*A. albifrons*), but for the most part it is found slightly less far north, in the regions of birch- and willow-scrub, and often on the higher fells (see page 216).



C. T. Dalgety

Habitat of Greenland White-fronted Goose (*Anser albifrons flavirostris*)

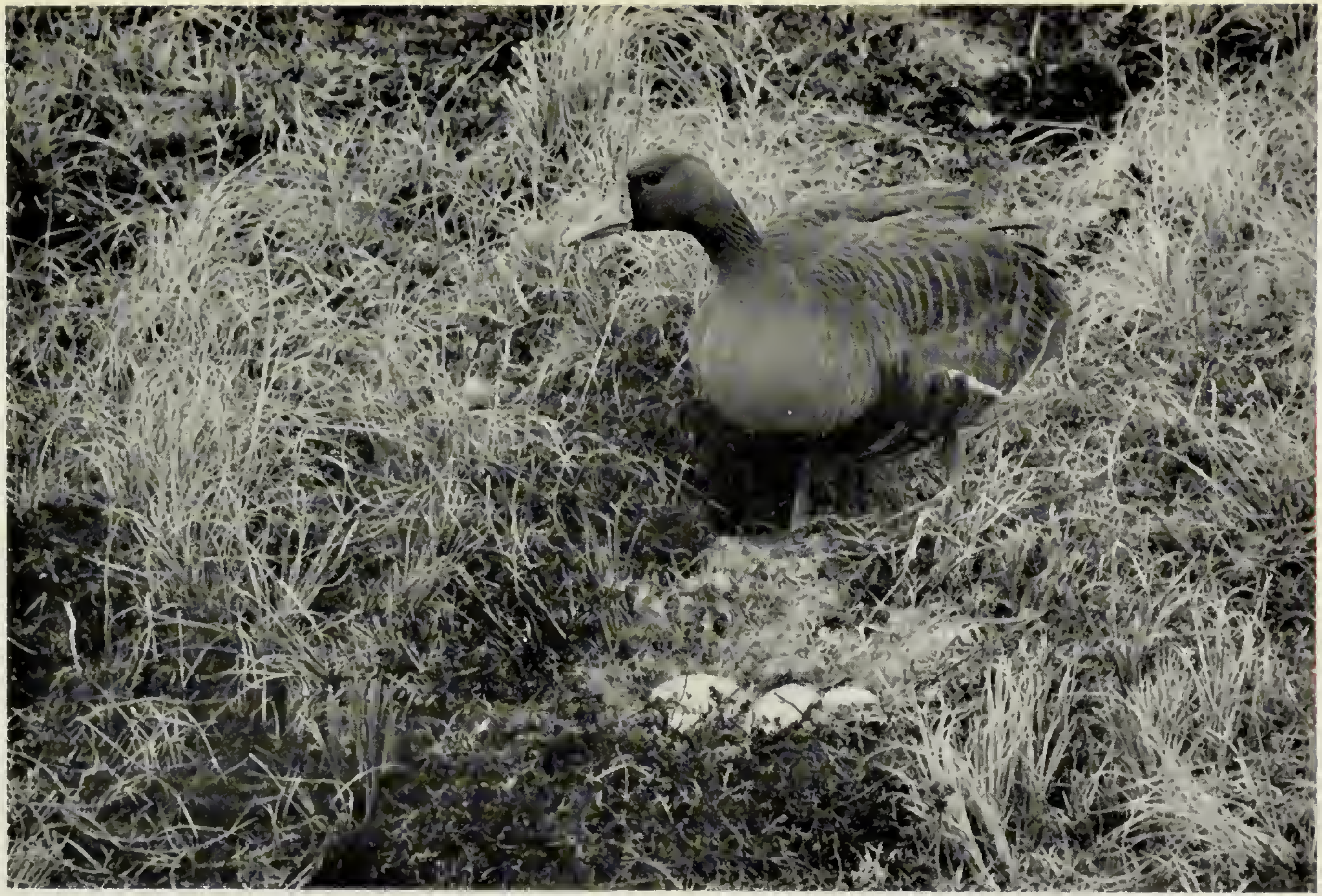


C. T. Dalgety

Greenland White-fronted Goose (*Anser albifrons flavirostris*), nest and eggs: west Greenland

Open tundra, river-islands and flat marshy valleys are the typical nesting-habitats of, so far as is known, all the races of the White-front, which thus normally has much less exacting requirements than the cliff-loving Pink-foot (*A. arvensis brachyrhynchus*)—see, *antea*, plates 9-16. The nest is lined with heather and grasses and pale grey down.

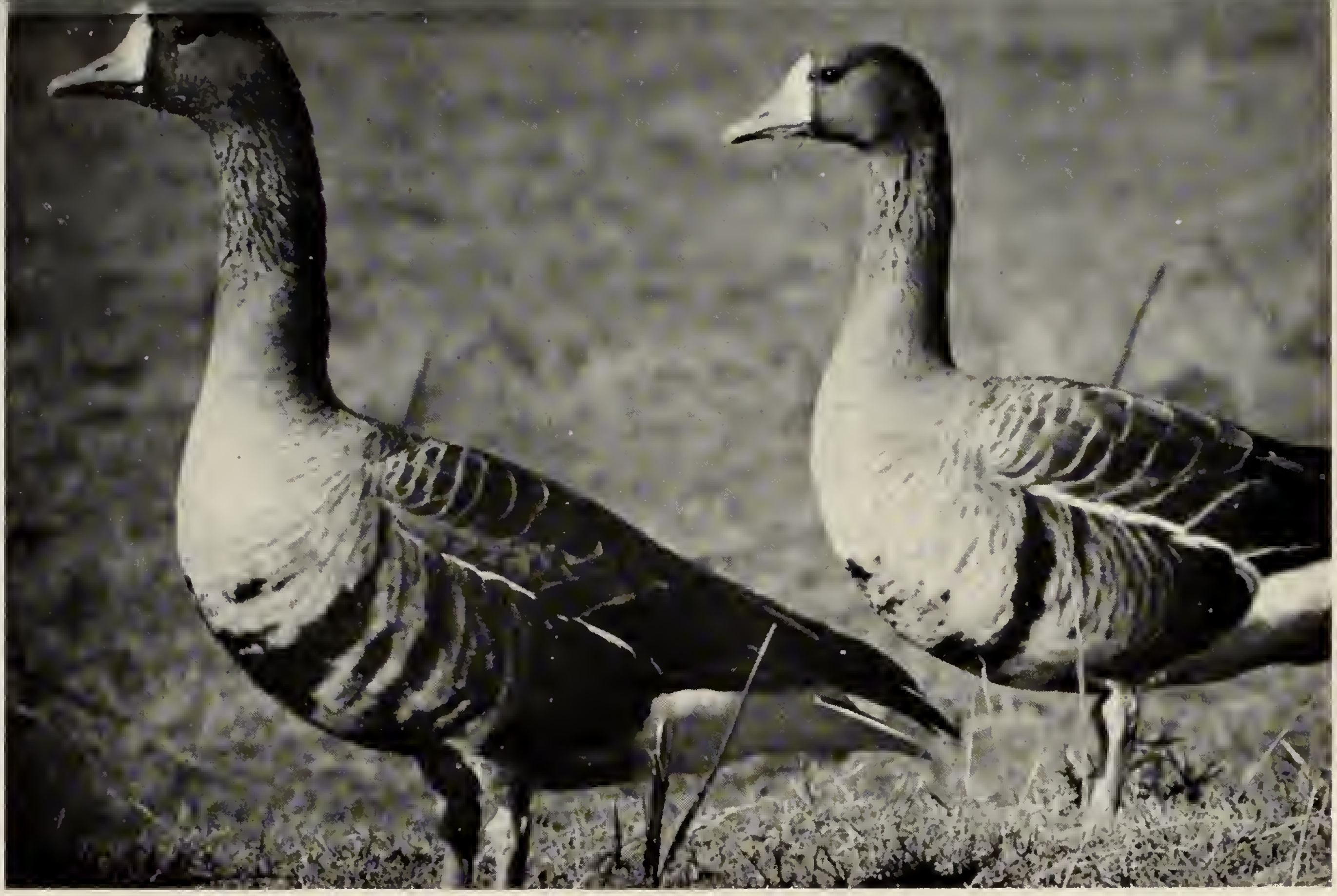
BRITISH MUSEUM NATURAL HISTORY



Niall Rankin

WHITE-FRONTED GOOSE (*Anser albifrons*): ALASKA, 1950

Birds from Alaska have recently been separated as *A. a. frontalis* (see page 217). A comparison between this and the Lesser White-front (*A. erythropus*) illustrated in plates 21-23 will show some of the more obvious differences between the two species, notably the larger bill of *albifrons* and its smaller white "front", lack of yellow eye-ring and its more heavily barred under-parts.



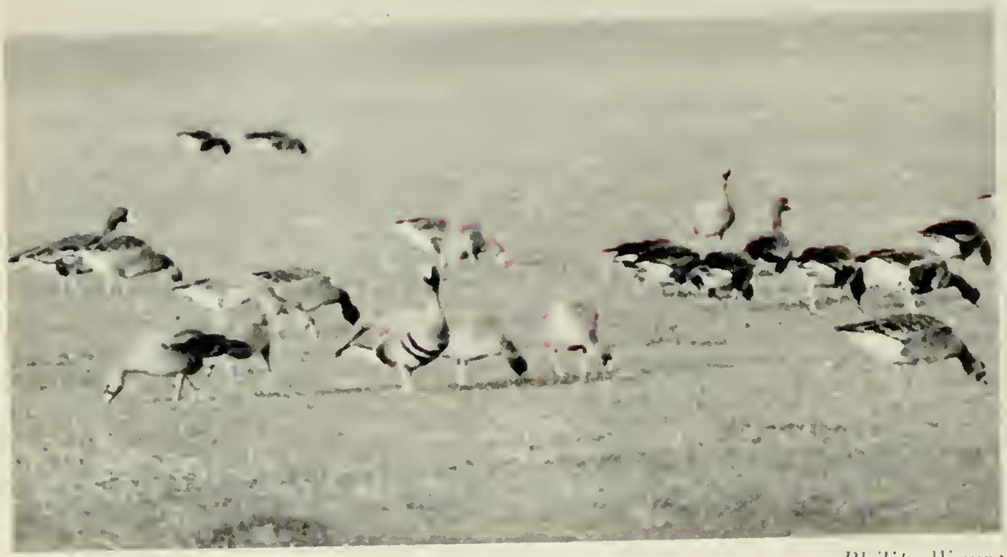
J. V. Beer

ADULT WHITE-FRONTED GEESE (*Anser albifrons*): GLOUCESTERSHIRE, MARCH 1956

This photograph gives some indication of the variability in the breast-markings, which are sufficiently diverse to act as "finger-prints" for individual recognition. It has recently been confirmed by the work of the Wildfowl Trust that, once adult plumage is attained and the barring appears, this variability is not directly dependent on age or sex. These birds are of the typical race (*A. a. albifrons*), as are nearly all the White-fronts occurring in England (see page 217).

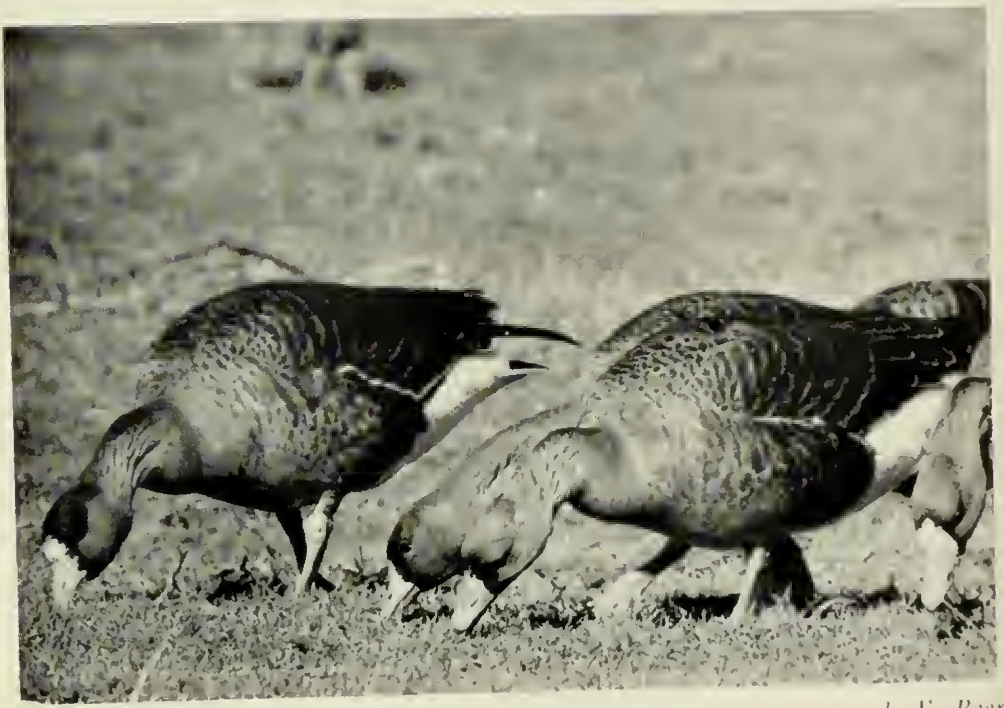
PLATE 28

NATURAL HISTO



Philip Wayre

WHITE-FRONTED GEESE (*Anser albifrons*): GLOUCESTERSHIRE, 1947



J. V. Beer

IMMATURE WHITE-FRONTED GEESE (*Anser albifrons*): GLOUCESTERSHIRE, MARCH 1956

These birds are about 9 months old and though at this age the white forehead is usually present to a greater or lesser extent, the belly-markings are absent or nearly so. Young White-fronted Geese with little-developed foreheads are sometimes confused with other grey geese.

feathering at the base of the bill to extend in a rather narrow band far onto the crown. The flattened crown of the goose portrayed here mars the effect.

This bird also shows rather more black feathers on the breast and belly than usual. Many adult individuals show scarcely any black. In their first winter, young Lesser White-fronts are rather less clearly differentiated from young *albifrons* (plate 28, lower) than are the adults, for the white feathering on the forehead is little developed but the orbital ring is always present though sometimes less pronounced. The small bill and short neck remain distinctive. A useful field-character when Lesser White-fronts are feeding among White-fronts is the higher rate of grass plucking of the former due no doubt to the small bill and short neck.

In general, it is not safe to rely on body-size in separating the species because there is an overlap. It is quite possible that some unusually large apparent "Lessers" and some small "Commons", particularly when these have orbital rings which are rather more yellow than is usual, may be hybrids, but no one has yet established what such hybrids should look like. They have not, at any rate within recent years, been produced in captivity. In February and March 1956 among the wild geese at Slimbridge there was an adult Lesser White-front firmly mated to a Common White-front accompanied by two juveniles, but the latter in no way resembled *erythopus,* and were not thought to have been hybrids. But hybrids could certainly be expected from this pair in the winter of 1956-57. Also in February 1956 (see page 229) a bird which may have been a hybrid was recorded on the Hampshire/Sussex borders.

The two races of *A. albifrons* found in Britain have very distinctive breeding-ranges. *A. a. albifrons* breeds in Russia and Siberia, north of the Arctic Circle, while *A. a. flavirostris* breeds in west Greenland. (Between the two are some populations of doubtful distinctness, including the birds from Alaska, recently described as *A. a. frontalis,* see plate 26, and the large form known as the Tule Goose, *A. a. gambeli,* whose breeding range in Arctic North America is still obscure.) Plate 25 illustrates the breeding-ground and nest-sites of the Greenland race. The sites used by *A. a. albifrons* are similar, so far as is known.

The Greenland form, first described in 1948, winters almost exclusively in Ireland and Scotland. A few hundred occur regularly in Wales, but in England it is only a vagrant. The population seems to be of the order of 25,000, the majority in Ireland, where it is very widely distributed, usually in rather small flocks. Large flocks occur on the Wexford Slobs, where it seems to be increasing. In Scotland the principal haunts are in the Hebrides and the south-west: numbers have decreased in the Tay and Dee regions. Specimens of this race have been obtained in eastern North America, but, rather surprisingly, it does not occur there in numbers.

The numbers of *A. a. albifrons* visiting Britain are small (5-7,000 in recent years) and are almost entirely confined to southern England and Wales. Though the winter range thus overlaps with that of the Greenland race, mixed flocks do not occur, because their choice of feeding-places is different. *A. a. albifrons* feeds largely on grasses, typically on wet land near the coast; *flavirostris* is more inclind to frequent inland bogs and feeds on the roots of marsh-plants.

The English population of *A. a. albifrons* seems to be only a part of a larger north-west Europe group, found mainly in Germany from October to mid-December and then dispersing through the Low Countries and northern France as well as England. The nature and timing of the dispersal varies from year to year, despite the persistence with which White-fronts return to long-established haunts.

The spring movement towards the breeding-grounds starts from Britain in mid-March and ring recoveries in April in south-central Russia indicate that the geese fly eastwards first, turning north later and following the "break-up" to the Arctic Ocean.

PETER SCOTT

SONG OUTPUT OF UNSTIMULATED SKYLARK

By NOBLE ROLLIN

ON our arrival on the Farne Islands, Northumberland, on 16th April 1955, a Skylark (*Alauda arvensis*) was heard singing on the Inner Farne. This small island, which is only about a quarter of a mile long, stands some one and a half miles out to sea from the mainland. The singing bird proved to be unmated. It was singing on the 17th, and four of its songs were timed. These were respectively 2, 1, 1 and 1½ minutes in length. On the 18th an all-day watch (Ref. No. 134) was made on the song. The bird sang first at 03.46* (1 minute). Later it sang songs of ½, 1½, ¼ and ½ minutes at 05.45, 06.24, 06.28 and 08.42 respectively and gave its last song (½ minute) at 11.16. This gave a total output for the day of 4¼ minutes and an average of 0.7 minutes per song. There was no afternoon or evening singing. On the 19th the bird was heard singing again in the morning and commencing at 09.39 it produced a vigorous 13-minute song. This long burst apparently exhausted the bird's output for the day as it never gave any more sustained song. At 16.36 and 16.38 it was heard to utter some broken ground-song. During the 13-minute effort the air was still and it was brilliantly sunny. On the 20th the bird had gone and there was no Skylark on the Island.

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* All times given in this paper are in Local Apparent Time, i.e. time by the sun at the place of observation. To convert this to G.M.T. add 7 minutes to times on 18th April and 8 minutes to times on 21st April.

On the 21st a new Skylark had taken its place. This bird had a different song (short tape recordings were made of both birds for identifications). As observations had already begun before the bird appeared, it was possible to make an all-day watch (Ref. No. 135) on its song on the day of its arrival. Observation commenced at 03.35: at 05.32 the new Skylark was noted on the Island and at 05.43 it sang its first song (2 minutes). In its first full hour, 05.43-06.43, it sang a total of 4¾ minutes and in its last full hour, 15.46-16.46, 2½ minutes. The complete output for the day in clock hours, commencing with hour 6 (05.30-06.30) was 4¾, 7, 9½, 5½, 9, 3¾, 1½ (noon), 1½, 1, 0, 2 and 1 minutes respectively. The bird sang a total of 36 songs during the day none of which was longer than 2 minutes, except one of 3 minutes at 06.48. Its total output for the day was 46½ minutes and the average song-length was 1.3 minutes. This is less than the average length of Skylark song which I have worked out as 2.2 minutes (*Scot. Nat.*, 1931, p. 49). It is, however, nearly twice as much as the average of the Skylark which had left the Island, and is probably quite high for the bird's first day in its territory. During part of the day there was a second Skylark in the territory of the new singer. This second bird was seen first at 08.25. It did not sing and by its behaviour appeared to be a hen. At 10.15 the singer faced this bird on the ground; later there was a chase at the end of the song and at 10.34 the two birds were again seen on the ground together. The new singer continued to sing on the 22nd and was singing on the 23rd when we left the Inner Farne. Mr. J. M. Cullen who came to the Island on this day, informs me that song (not necessarily of this bird) continued at intervals into the second week in May, after which no Skylarks were seen.

The weather on 18th April was fair; and was bright and sunny except at the beginning of the day when it was overcast until about 09.00. After this there were increasing amounts of sunshine which became continuous from 11.00 to sunset. Temperature during observation, maximum 43° F. (at noon), minimum 40° F. Relative humidity, maximum 97%, minimum 86% (at 11.00). There was a light breeze up to 10.00 when it strengthened to, and remained at, a gentle breeze until 15.00. By 16.00 it had dropped to a light breeze, by 17.00 to light airs and from 18.00 onwards it was calm.

On 21st April it was fair but in the main overcast, except for some sunny periods mostly in the morning. The main sunny period was between 09.00 and 12.00 when the sun was out two-thirds of the time. Apart from this there was a little sunshine between 05.00 and 06.00 and between 16.00 and 18.00. Temperature during observation, maximum 47° F. (at noon), minimum 40° F. Relative humidity, maximum 89%, minimum 80% (at 14.00). It was calm up to 05.00, light airs at 06.00, light breeze from 07.00 to 15.00 (except light airs at 13.00). The wind rose from a gentle breeze at 16.00 to a moderate breeze at 20.00.

The results of the two all-day watches, plotted hour by hour, are shown in Fig. 1. Included in Fig. 1 is the temperature, the humidity and the position below the horizon of the sun during dawn and dusk. Our party consisted of Dr. and Mrs. Gordon Onions, Miss B. Rollin, Mrs. Noble Rollin and myself.

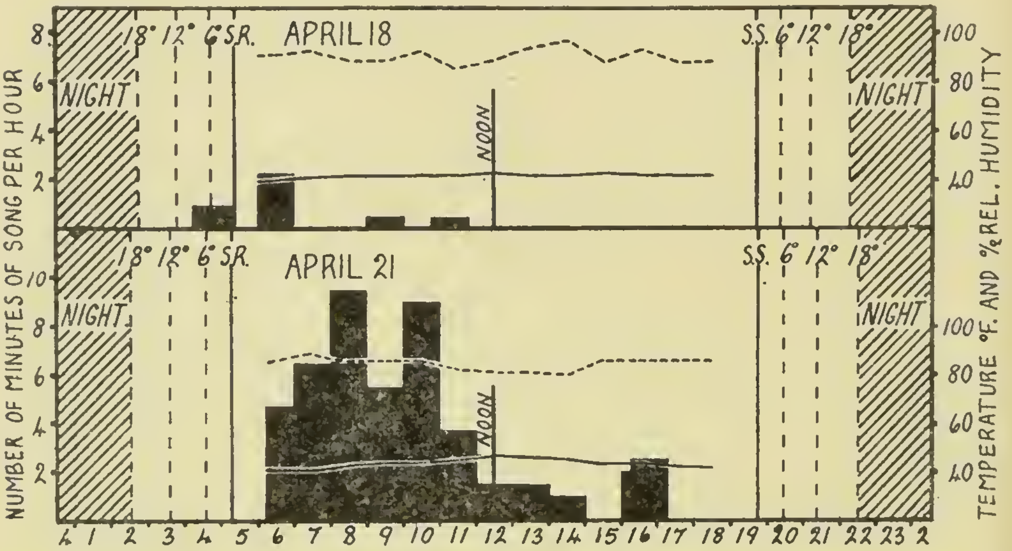

FIG. 1—TOTAL SONG-OUTPUT OF TWO INDIVIDUAL SKYLARKS (*Alauda arvensis*) ON SEPARATE WHOLE DAYS

Each bird was unstimulated in that on neither day was there another Skylark singing within 1½ miles; the bird on 18th April was about to abandon its territory, while the one on the 21st had just arrived. Relative humidity is indicated by the broken lines, temperatures by the continuous ones.

Owing to the distance to the mainland it can be stated with some certainty that neither of these Skylarks on the Inner Farne could hear any other Skylarks singing. In consequence, on both of these days and on the other days when they were heard, they were singing without any immediate song-stimulation from other birds. As might be expected the output of the bird about to vacate its territory was low (4¼ minutes) although it gave an exceptional (for it) 13-minute song on its last day. On the other hand, the incoming bird (which came after the outgoing bird had left) had quite a high output (46 minutes) for its first day. This may be compared with the results of all-day watches I made* on a Skylark which gave a total output of 68½ minutes in April (*antea*, vol. xxxvi, p. 149), 47 minutes in May and 181 minutes in July (*antea*, vol. xxxvii, p. 87). Although unstimulated whilst on the Inner Farne, it seems highly probable that the newly arrived bird had been stimulated by the song of other Skylarks on the mainland during the days before it came to the Island.

Although Skylarks may be seen about the Farne Islands in spring there is no reliable record of a pair having bred there (Grace Watt, *The Farne Islands*, p. 66; and Grace Watt

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* In 1942 on the mainland—near Wallsend, Northumberland.

(Hickling), *Ornithological Report on the Farne Islands* for 1950, and to date). As birds appear to be able to maintain themselves in song on the Inner Farne and there are suitable nesting-places, it may be that lack of stimulation from other birds is one of the causes of their leaving their territories without breeding. This lack of stimulation applies of course to display as well as song. In this connection it was noticed that the Skylark which left the Island during our stay, repeatedly playfully chased the Rock Pipits (*Anthus spinoletta*), apparently in the absence of any Skylarks to chase.

THE MOULT-MIGRATION OF THE SHELDUCK FROM CHESHIRE IN 1955

By R. H. ALLEN and G. RUTTER

INTRODUCTION

IN JULY 1950 nightly observations in Cheshire confirmed that there was a moult-migration of Shelduck (*Tadorna tadorna*) from the River Mersey, including the Dee, similar to that from Morecambe Bay, Lancashire, described by Robert A. H. Coombes (*Ibis,* vol. 92, pp. 405-418), but on a smaller scale. A survey of this migration has been taken each year since 1950 and the total annual departures are approximately 1,500-2,000, while Coombes's figures for the Morecambe Bay/Aire Gap route in 1949 were 3,352.

Briefly, the following information has been gained on the Mersey migration during the five years previous to 1955:

(a) Flights leave the Mersey at Weston, near Runcorn, Cheshire, in a south-east direction. Then, at a point about 2 miles away, most either turn north-east or east, but some still continue onward in a south-east direction for a further 2 or 3 miles, before turning eastward (see Map 1).

(b) The peak hour of Mersey departures is 8.45 p.m. to 9.45 p.m. (B.S.T.); there are seldom any before 8 p.m. or after 10 p.m.

(c) Flights are at about 200-500 feet when the birds leave, and they rise to 800-900 feet after the 2 miles' distance.

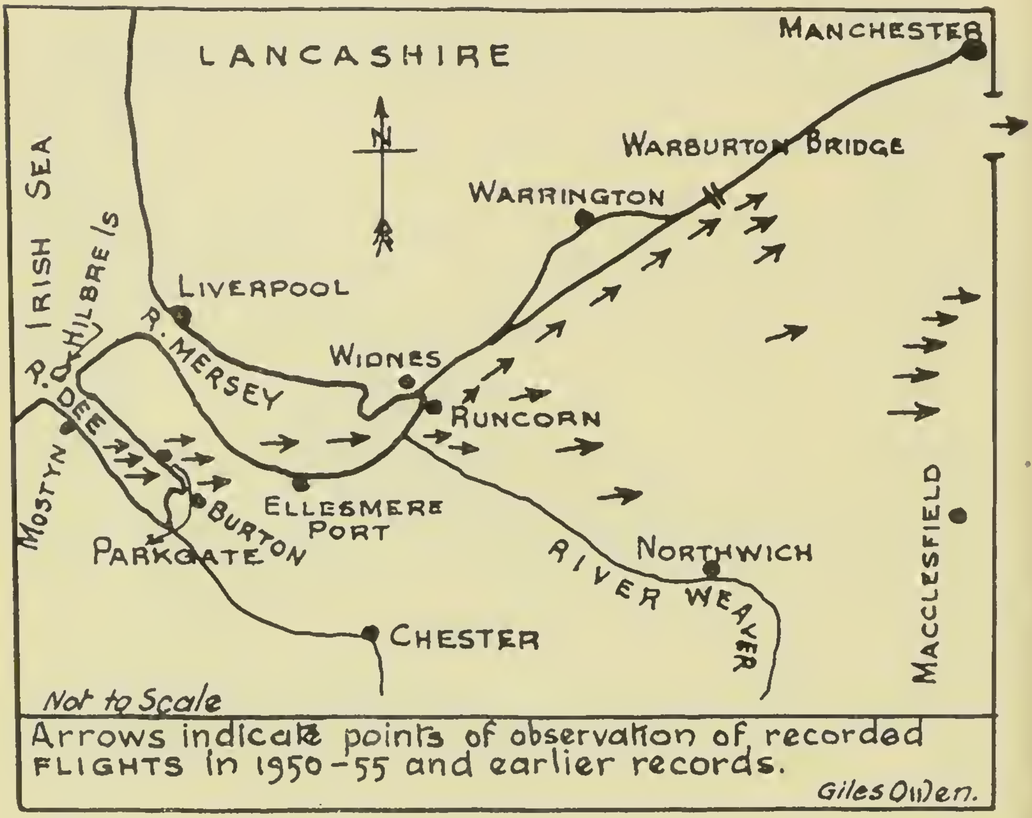
(d) A few early flights arriving from the Dee rest on the Mersey for an hour, and then move off. Some later flights from the Dee also come down to rest on the Mersey, but these do not continue their journey until the next night.

(e) Wind is a vital factor in Shelduck migration, checking all activity if adverse in direction; strong north-west winds make the birds take a more southerly route across Cheshire.

(f) The Manchester Ship Canal is a guide for many flights which fly parallel to it for long distances in a N.E. direction (see

Map 1). It appears that when they reach a point near Warburton Bridge, 13 miles from Runcorn, they turn east.

(g) Shelduck make a detour south of Weston Point and Runcorn, which we believe is to avoid the smoke streams from the industrial chimneys there and at Widnes. This might also be the reason for the deviation from the Manchester zone.



MAP 1—TO SHOW ROUTES TAKEN BY SHELDUCK (*Tadorna tadorna*) DURING MOULT-MIGRATION FROM THE CHESHIRE COAST

(h) Records received in the past two years suggest a 10-12 miles wide passage-belt, less than 10 miles south of Manchester.

(i) The route across Cheshire to the Wash, which is indicated by the number of south-east departures, is not supported by any evidence, though we have made efforts to obtain it.

Details of some of the observations in previous years have appeared in the annual *Bird Reports* of the Merseyside Naturalists' Association.

THE MOULT-MIGRATION IN 1955

1955 was the sixth successive year of observation on these late evening departures of Shelduck on moult-migration from the Mersey estuary at Weston, near Runcorn, Cheshire.

The first movement was seen on 6th July and flights continued until 3rd August. The weather was fine, dry and free from cloud throughout July and gave ample opportunity of estimating the effect of wind on these movements, a factor which had already been proved to be of major importance. Thus on 16th and 23rd July, when field-meetings were held at Weston for those interested and the nights were favourable—fine weather, no low cloud and no adverse wind from the east—totals of 148 (4 flights) and 118 (5 flights), respectively, left after typical preliminary circling over the estuaries of Mersey and Weaver. In contrast easterly or south-easterly breezes prevailed on 8th, 9th, 18th, 20th, 24th, and 25th July and on those evenings there was no activity at all.

Weston Marsh bird-reserve, where these two meetings were held, has been shown to be the area over which nearly all departure flights from the Mersey estuary pass and from which it is possible to watch the birds in flight at close quarters. It is interesting to compare the number of birds seen to leave the Mersey over Weston during the years in which these flights have been investigated and to note that there is little material difference that may not be accounted for by a possible variation in the intensity of observation: in 1950-1,583; in 1951-2,002; in 1952-1,673; in 1953-1,638; in 1954-1,710; and in 1955-1,909 in 57 flights. The details for 1955 of the nightly flights and records of birds seen west and east of the observation area are given in Table I.

In 1955 Mr. E. M. Conder was able to supplement the observations at Weston with records of movements from the Dee estuary, made during six evenings from the top of the ridge at Haddon Wood, Burton in Wirral. His notes for two of these nights seem to prove that some at least of the birds from the Dee estuary on their way eastwards may settle for a time in the Mersey estuary before continuing their flight. Thus on 17th July, when 142 Shelduck left the Dee, 121 left the Mersey; on 21st July 190 left the Dee and 142 left Weston. It also seems probable that a flight of 55 that left Denhall House, near Burton on the Dee, at 9.20 p.m. on 17th July were the same birds as 55 that left Weston at 9.47 p.m. The places are 13 miles apart and the speed indicated roughly 30 m.p.h. with a slight following breeze (on one occasion we timed a flight of 5 miles at 50 m.p.h.). This instance supports our view that many of our late-at-night departure flights recorded at Weston come from some distance, to judge from their direction of flight and the lack of circling.

Mr. Conder's impression is that the ducks come up river from the direction of the Dee mouth or assemble opposite Flint. He saw one or two flocks do so and then settle in various places or pass on eastwards either at Ness, whence they flew east over Willaston towards Ellesmere Port on the Mersey, or at Denhall (a little further south) and then east over Haddon Wood and Burton towards Weston. He noted that the later flights were more prone to fly in a big circle and then return or to make off in a south-east direction. Our belief is that these Dee flights do not in fact come from the mouth of the Dee at Hilbre where comparatively few

TABLE I—DEPARTURES OF SHELDUCK (*Tadorna tadorna*) FROM WESTON (RUNCORN), CHESHIRE, WITH DETAILS OF OBSERVATIONS TO THE WEST AND EAST: 1955.

(The names of the observers whose initials are included here can be found in the "Acknowledgements".)

Date	Departures from Weston (Runcorn) Flights	Birds	Flights recorded west of Mersey	Flights recorded east of Runcorn
Jul. 6th	1	35		
10th	3	49		
11th	2	61		
12th	4	115		
13th	1	59		25-30 flying E. near Gt. Budworth (11 miles) at 8.30 p.m. (W.C.)
14th	1	21	13 flew N.W. from Parkgate at 9.15 p.m (E.J. & M.E.C.).	
15th	3	79		
16th	4	148	55 and 16 flew E. from Parkgate at 9.15 p.m. and 9.20 p.m. (E.J. & M.E.C.)	
17th	3	121	142 in 5 flights left Dee at Neston and Denhall House between 8.30 p.m. and 9.35 p.m. (E.M.C.).	
18th	—	—	10 flying S.E. from Dee, at Haddon Wood, Burton, at 10.10 p.m. (E.M.C.).	
19th	5	283		
21st	5	142	190 in series of flights left Dee, mostly from Neston, between 8.30 and 10.10 p.m. (E.M.C.).	
22nd	4	198		22 circled over Sinderland sewage farm (15 miles) and flew E. at 9 p.m. (P.W. & A.R.S.)
23rd	5	118	75 left Ness and flew E. of Willaston at 8.25 p.m. (E.M.C.).	
26th	2	98		40 flying E. over Woolston Weir (11 miles), near Manchester Ship Canal, at 10.02 p.m (T.W.).

TABLE I—DEPARTURES OF SHELDUCK:—*Continued.*

Date	Departures from Weston (Runcorn)		Flights recorded west of Mersey	Flights recorded east of Runcorn
	Flights	Birds		
Jul. 27th	3	84	35 left Denhall at 8.40 p.m. and 30 left Ness at 8.45 p.m. (E.M.C.).	7 flying N.E. over Dunham (14 miles) at 9.35 p.m. (P.N.); 40 over Sinderland, no time stated (A.R.S.).
28th	5	170		
30th	1	30		60 "geese" reported to A.W.B. as flying E. over Alderley (21 miles) about this date may have been Shelduck.
31st	3	74		
Aug. 1st	1	18		
3rd	1	6		
TOTAL	57	1,909		

gather, but from Mostyn Sands, a popular feeding-ground on the Welsh side of the Dee estuary, or from the water opposite Parkgate in Wirral, where large numbers assemble at high water on the big tides (on 14th November 1954 we counted 600+ here). The conclusions to which we have come about movements from the Dee should, however, be regarded as tentative until further observations in the area are made.

It remains to consider from where come all the 1,500-2,000 Shelduck that make the seasonal migration each July: whether the Dee and Mersey populations together are enough to cover the total of migrating birds recorded at Weston; or whether some come from the N. Wales coast or even further. T. S. Williams in the Liverpool Field Club's proceedings for 1952 gave details of the numbers of Shelduck he had counted as they fed on Mostyn Sands on the west (Welsh) side of the Dee estuary over a period of three years. During the winter months the lowest number was 200 and the highest 1,000; from May to September only a few were present. He also saw 2,000-3,000 on 28th March 1949 riding on the water at ebb tide. In the Mersey our monthly records for the 1954/55 winter averaged 285 with a maximum of 800+. Taking the average for the two estuaries it is therefore evident that some must come from elsewhere to account for the high concentration sometimes seen in winter.

YOUNG BIRDS

Few observations have been made on the movements of the young birds in the second week of August after the departure of the adults, but the attention of one of us (G. R.) was drawn to the nightly circular flights of young Shelduck at dusk each evening on the Mersey.

He observed that each flock was headed by one or two big duck. The flocks varied from 10 to 40 birds. These flocks seemed to take off from around the Hale Point/Hollpool Gutter area. They flew at 100-300 feet, following the Mersey to Weston Point (about 2 miles), turned south-east, then flew over Weston Village, or if not high enough, followed the contour of the hill. After about a mile, they turned south-west and circled gradually to the west, finishing where they started, a flight of 5 or 6 miles.

There is also evidence that there may be some slight movement inland of family parties. A. W. B. writes: "On 9th September 1947, a party of 13 Shelduck, all young birds, appeared on Witton Flashes, Northwich, 11 miles E.S.E. inland from Weston; they gradually dwindled in number to 4, which were still there on 17th October. Again on 8th September 1948, 5 young birds arrived and stayed until 7th October".

ACKNOWLEDGEMENTS

We wish once again to thank all who have helped to compile our records, and not least those whose efforts went unrewarded because they were not lucky enough to witness the flights. It should always be borne in mind that it is almost certain no flights will take place with the wind in the east or south-east, and the ideal night to watch is a fine evening following one or more adverse weather evenings between 15th and 30th July. We wish particularly to acknowledge the assistance of the following, who either helped to compile our annual lists of departures, or who provided information on flights outside the immediate area of Mersey:

J. K. Allen, A. W. Boyd, E. J. Castle, M. E. Castle, W. Clark, R. B. Cockbain, E. M. Conder, R. A. H. Coombes, W. B. Driver, L. Frodsham, P. G. Garlick, E. Hardy, S. G. Hopkins, M. B. Hutte, E. Liddle, D. W. Mackie, H. L. Montgomery, M. Nelson, P. Newton, E. E. Preece, D. Palmer, H. Routledge, G. Thomason, G. R. Walton, I. M. Walton, T. Waring, E. F. Whiteley, D. Whiteley, P. Wolstenholme, A. R. Sumerfield.

We are also extremely grateful to Mr. Giles Owen who drew the map for us.

NOTES

Green-winged Teal in Co. Kerry.—On 16th February 1955, on Akeagh Lough, Ballyheigue, Co. Kerry, I saw a drake Green-winged Teal (*Anas crecca carolinensis*) which was accompanied by a duck, probably of the same race.

When first seen, the drake was asleep and floating idly by himself on the near side of the lough, and I was able to advance to within *ca.* 15 yards range, whereupon a pair of Teal (*A. c. crecca*) which had been feeding near-by swam quickly out on to the lough, closely followed by another duck. I was watching the drake in order to note the head-pattern as soon as it should awaken and, while thus engaged, found that this duck was edging her way back towards the drake until she was swimming within about two yards of him.

After a little while the drake raised his head and I had an excellent view of the pattern in bright sunshine. Then the duck took wing, quickly followed by the drake, and both flew a short distance to pitch among Teal. Later, both left the Teal and stood on a muddy islet and preened. This was followed by bill-to-bill dabbling in shallow water after which they swam off until they were lost among *ca.* 200 Teal.

Drake and duck were closely watched for over two-and-a-half hours, during which time they showed every sign of being a pair. The drake was easily distinguished from the many drake European Teal on the lough by the creamy-white vertical stripe in front of either wing. He lacked the horizontal white stripe on the side, and the creamy line dividing chestnut and green on the head was also lacking. This latter feature gave the head-pattern a rather untidy appearance. The duck had one feature which served to distinguish her at all times, viz., her forehead, cheeks and chin were paler than those of any other female Teal on the lough. However, even this difference does not warrant the assumption that she was anything more than a probable Green-winged Teal.

FRANK KING

Lesser White-fronted Goose in Kirkcudbrightshire.—An adult Lesser White-fronted Goose (*Anser erythropus*) was observed on many dates between 31st December 1955 and 12th February 1956, in company with Bean Geese (*A. arvensis arvensis*), in the same locality in Kirkcudbrightshire as in the past two winters. It is possible that the bird remained longer in the neighbourhood. Like one of last season's birds it was slightly lame and it may even have been the same individual. All the typical features of the species were clearly seen by a number of observers, the small size, prominent white frontal blaze and golden yellow eye-lids being particularly noted. It was slightly more strongly barred on the under-parts than any I had seen in previous years.

It may be worth adding that on a number of occasions between 18th December 1955 and 18th February 1956, among the same flock of Bean Geese, were one and sometimes two first-winter White-fronted Geese of the typical race (*A. albifrons albifrons*). On 17th and 18th January R. F. Ruttledge and I made careful comparisons between these birds and the local White-fronts which are of course generally of the Greenland race (*A. albifrons flavirostris*).

From their behaviour throughout the period as intergral members of the Bean Goose flock, it seems likely that both they and the Lesser White-front had travelled to Britain with the Bean Geese.

DONALD WATSON

Lesser White-fronted Geese in Gloucestershire, 1956.—At least six and possibly eight Lesser White-fronted Geese (*Anser erythropus*) were seen in the flock of White-fronted Geese (*A. a. albifrons*) on the River Severn at Slimbridge, Gloucestershire, between 10th January and 12th March 1956. Since the views obtained were not always sufficient for recognition of particular individuals some uncertainty exists about the number present and the length of stay of the various birds. The first bird seen was a large juvenile: this was identified on 10th and 23rd January, 28th February and 7th March (by which date it was in adult plumage). A second, small juvenile was seen on 23rd January. A juvenile seen on 11th and 12th March may have been the same bird, but seemed rather paler and larger. No adult was seen until 8th February, but between then and 12th March twelve records of adults were made, which referred to four, or perhaps five individuals. One of them, a rather small adult male, seen on 6th and 7th March, was mated to a female *A. a. albifrons* with two young, but the young were not distinguishable from those of *albifrons*. There were three other adults, all single: one seen between 8th February and 2nd March; one on 7th March, the third on 12th March. An adult seen on the 11th March could have been the second of these, or possibly the first juvenile. All these birds were seen by P. S., five also by H. B., and various of them by a number of other observers.

If the minimum number of six individuals is accepted, the number of records of this species at Slimbridge between December 1945 and March 1956 is raised to thirty.

PETER SCOTT and HUGH BOYD

Lesser White-fronted Goose in Norfolk.—During the last week of December 1955, a flock of about 100 Bean Geese (*Anser a. arvensis*) arrived in the Yare valley, E. Norfolk. On 1st January 1956 P. W. P. Browne spotted a small goose in flight with them, and this was also seen by P. D. Kirby, R. H. H. and M. J. S.; unfortunately, however, it could not be identified with any certainty. Three weeks later, on 22nd January, E. A. Maxwell, C. J. Sellick, H. B. and R. H. H. were able to identify an adult Lesser White-front (*A. erythropus*) feeding with 97 Bean Geese on these same marshes; visibility was excellent and the bird was watched for some time at ranges down to 150 yards; identification was based on the small head and short, pinkish bill, the high white blaze on the forehead (extending to the top of the head behind the eye) and the long wings (tips passing the tail). During the next six weeks what was presumably the same bird was seen on several occasions by R. H. H., still among the Bean Geese. On 5th March M. J. S. and his wife were able to approach it to within 70-80 yards, thus being close enough to pick out the yellow eye-ring in addition to the features noted above; the bird had 5 or 6 short black bars on its belly; on this occasion it was feeding with 85 Bean Geese and 13 White-fronts (*A. a. albifrons*). The bird apparently left with the Bean Geese between 6th and 7th March. There is no evidence that more than one individual was ever present and it seems probable that the one Lesser White-front spent some 10 weeks in the locality.

HUGH BOYD, ROBIN H. HARRISON and MICHAEL J. SEAGO

Apparent hybrid Lesser White-fronted x White-fronted Goose in Hampshire and Sussex.—On 25th February 1956, one of the last days of the very cold spell, I found a small party of grey geese, fifteen in number, on Hayling Island, Hampshire; they were feeding in a corner of the fresh marsh just south of the creek known as Mill Rithe. The light was exceptionally good and I spent something over two hours lying within 50 yards of these birds. Fourteen of them were White-fronted Geese of the typical race (*A. a albifrons*), but the last one had an extremely conspicuous yellow eye-ring, from which I concluded that it must be a Lesser White-front (*A. erythropus*). It was, however, in other respects hardly typical of that species. I had seen 5 or 6 Lesser White-fronts previously, all of them in Gloucestershire, and this bird did not stand out in the way that they had done. It was not noticeably smaller than the other geese, and neither its bill nor its neck appeared to be materially shorter than theirs. It was an adult bird with a rather low, round-topped, white patch on the forehead, and rather indeterminate black bars on the breast. The only plumage-feature of note was that on the right-hand side there were two small black marks from near the top of the flank. The yellow eye-ring was extremely striking, but had I not been so very close to the bird and therefore able to distinguish this feature without any doubt, I would probably not have noticed that this individual was in any way different from the rest of the party. In fact, if hybrids between the two species do occur, then I am fully prepared to believe that that is what this bird was. At about two o'clock the whole party left of their own accord and flew eastwards over Chichester Harbour in the direction of Itchenor, Sussex.

KEITH SHACKLETON

[We have discussed this record with Mr. Peter Scott and he has commented as follows: "It is my theory that hybrids between Lesser and European White-fronts (*A. erythropus* and *A. a. albifrons*) occur from time to time among the geese visiting Britain. This idea is based (1) on the occurrence, in the winter flocks, of Lesser White-fronts which are paired to European White-fronts; (2) on observations of "Lesser White-fronts" which are unusually large; and (3) on the bill-measurements of a specimen from the Severn Estuary now in the British Museum (Natural History). As the swollen yellow eyelid is prominent in captive hybrids between Lesser White-front and Greater Snow Goose (*A. hyperboreus atlanticus*) this may be supposed to be a dominant character, and wild hybrid Lesser x European White-fronts would be likely, if seen sufficiently closely for the eyelids to be observed, to pass as pure Lesser White-fronts. The present record may refer to such a hybrid, though it should be noted that large Lesser White-fronts of pure origin are sometimes very little different in size from European White-fronts, though the bill is always shorter".—EDS.]

Greater Yellowlegs on Cornwall/Devon border. — On 11th October 1955, I came across a wader about the size of a Greenshank (*Tringa nebularia*), but with long, vivid yellow legs, standing and preening in a pool of water surrounded by soft mud, at Tamar Lake—which lies across the Cornwall/Deven border. The light was ideal and I was able to watch the bird for over an hour. My first impression was that, in spite of its size, it must be a Lesser Yellowlegs (*T. flavipes*) and, still retaining a clear picture of a bird of that species I had seen on the Camel estuary with Mr. T. J. Willcocks in September 1954 (*antea,* vol. xlviii, p. 364), I began to make notes of comparison. It was soon evident that several well-remembered features of the Lesser Yellowlegs did not correspond with the bird preening in the shallow pool now before me. The most important and quite obvious feature was the bill which was stoutish at the base and *definitely,* though only slightly, upturned. It tapered rather more finely towards the tip than the bill of a Greenshank. I clearly recalled the straight and slender bill of the Lesser Yellowlegs and noted this point as an important contrast. I was also struck by the more robust appearance and larger size of this bird as compared to the slender and fragile-looking *Tringa flavipes* which was actually a little smaller than a Redshank (*T. totanus*). The greyish mantle had a brownish tinge and was freely flecked with white and similar in pattern to the Lesser Yellowlegs. The whitish eye-stripe, was definite though not conspicuous; under-parts and front of neck were pure white.

When it was feeding, there was no probing in the mud but a dainty snatching from the surface of the water with frequent swift dipping movements, similar to those of a Greenshank. Often its long yellow legs were submerged as the bird waded into deep water. There were yet two important features to convince me that this rare wader was in fact a Greater Yellowlegs (*T. melanoleuca*) so I moved out from my place of concealment and put the bird up.

With full-throated Greenshank-like calls of two, three and four syllables it flew round and round noisily and literally rent the air with strident, vigorous cries of "tu-ee, tu-ee" which terminated with its descent and a musical yodelling of "ku-lee, ku-lee, ku-loo". In flight, the wings were dark and broad at the base, giving what I described as an "umbrella effect"; the "jizz" of the bird was stockier than that of a Greenshank, and the general impression I got was one of superb strength and control, of deliberate movement without apparent effort. On the wing, with neck outstretched and long legs extended well beyond the tail, the white rump and base of tail were exposed, and, in contrast to a Greenshank, there was no white wedge continuing up the middle of the back. Two special features convinced me of the correctness of my identification: (1) the stoutish, upturned bill; and (2) the vigorous, strident calls, together with the impression of a much stronger personality than the Lesser Yellowlegs possessed.

Unfortunately, the bird could not be found the next day, nor was it seen subsequently. F. E. CARTER

[We consulted Mr. Ludlow Griscom on the question of the "pure white" under-parts described by Mrs. Carter since this feature is not brought out in the details given in *The Handbook*. Adults in summer plumage are, of course, heavily streaked and spotted on the foreneck and breast and in winter these areas are still narrowly streaked. However, Mr. Griscom points out that the immature in first-winter plumage is immaculate white below with the streaking (in extreme specimens) very fine indeed and confined to the foreneck, so much so that, unless the observer was very close and knew exactly what to look for, "he could scarcely be blamed for reporting the under-parts as pure white".—EDS.]

Lesser Yellowlegs in Co. Wexford.—At Lady's Island Lake, Co. Wexford, on 9th October 1955, the undersigned came across a group of waders consisting of two Redshanks (*Tringa totanus*), a Greenshank (*T. nebularia*) a Spotted Redshank (*T. erythropus*) and a Lesser Yellowlegs (*T. flavipes*). The latter was at once noticeable for its slim build; long, slender, yellow legs, and its remarkable tameness.

The general outline of the Lesser Yellowlegs was that of a typical "shank". Size, about that of a Redshank, but slimmer (R. G. W.); a shade smaller than a Redshank and much slimmer (F. K.). Legs, noticeably long, slender and bright yellow—without any suggestion of orange whatever. Beak, slender, straight and black; the length was about that of a Redshank's, therefore appearing long on the slimmer bird. Crown, greyish-brown, forming a "cap" due to the pale superciliaries running from above the eye to the forehead where they met in the shape of a "V"; this "cap" was not apparent when one looked at the bird from a rear view. Sides of face, greyish; sides of neck, finely streaked greyish; front of neck, washed grey. Upper-parts, dark brown or blackish-brown, uniformly and very beautifully speckled with light grey. Back, blackish-brown. Rump, pure white. Tail, white, finely barred with pale grey. Under-parts, white.

In flight, the whole wing appeared very dark, as also did the upper back in contrast with the small, neat, white rump. The yellow feet trailed beyond the tail after the manner of a Spotted Redshank. Each time it was flushed, the bird called in a voice like that of the Greenshank, though not so loud or resonant. Its chief note was a double "kew-kew", but on two occasions it called rapidly, "kew-kew-kew".

On the ground it "bobbed" whenever it became suspicious, and, just before flight, it always adopted a "leaning forward" stance. On such occasions, too, its whole appearance was very slender, almost "pencil slim". It was noted that during all the time it fed it kept its legs flexed.

For long periods we watched it from *ca.* 12-15 yards' range, and once got within *ca.* 10 yards—though the place was absolutely devoid of cover. No matter how often we flushed the bird, it merely circled around us once or twice before returning to exactly the same spot, where it fed in splashy, energetic, Greenshank-style on shrimps, which were swarming in the shallow water at that point. On one occasion it was seen to feed in a jerky side-to-side manner, sweeping the water with its beak like an Avocet (*Recurvirostra avosetta*). We watched the bird for over three hours, after which we had to withdraw.

Subsequently, Mr. Peter J. Roche, of New Ross was contacted and he had excellent views of the bird on 11th October, when he found it feeding at the same spot at the lake-edge. It was last seen on 16th October by Mr. Roche and Capt. A. D. Place.

We ourselves were unable to revisit the lake until 23rd October, when we found that the water-level had risen and the shrimps, on which the waders had been feeding, were much reduced in number.

[This was apparently the only record in 1955, as against a total of 14 in 1953-54 (*antea*, vol. xlviii, pp. 363-366).—Eds.

R. G. Wheeler and Frank King

Melodious Warbler on Bardsey.—At 10.50 hours on 20th August 1955 a Melodious Warbler (*Hippolais polyglotta*) was taken from the catching-box of the Cristin Trap on Bardsey Island, Caernavonshire, having caught itself. I recognised it as a *Hippolais* warbler from the bird trapped here the previous August (*antea*, vol. xlviii, p. 284); the 1955 bird was in very similar plumage, the under-parts being very pale and the plumage rather worn, especially the primaries and rectrices. The heavy bill was the most striking character in the hand. The wings (primaries straightened) measured 65.75 mm. and the bird weighed 12.98 grammes. On being released it flew into a thick gorse patch and was not seen again. It was also seen in the hand by J. G. Williams, and photographed by Huw Jones. One of Mr. Jones's photographs is reproduced on plate 18 (lower) and, apart from showing the characteristic shape of the bill, this gives a good idea of the appearance of the closed upper wing and it will be noticed in connection with Kenneth Williamson's remarks (*antea*, pp. 119-120) that there is no sign of a light wing-patch such as he has recorded in the closely related Icterine Warbler (*H. icterina*); the 1954 bird had a similarly uniform wing.

Roy Thearle

[A full laboratory description of this bird has been sent with the above note. In connection with this question of the broad, pale edges to the secondaries of the Icterine Warbler overlapping in life so as to form a continuous light patch on the closed wing, and the possibility of this feature not occurring in the Melodious Warbler owing to the narrower edgings on the secondaries of that species, it is perhaps an opportune moment to make a few preliminary remarks summarizing observations made in south Spain in May 1956. Over 40 individual Melodious Warblers were carefully examined in the field and many others were seen less well. None of these 40 showed a continuous light area. In some the pale edgings were clearly visible when looked for, but in each of these the edgings were quite distinct as separate, narrow strips; in many of the birds, however, the pale edgings were so narrow as to be almost indeterminable.—I. J. F.-L.]

Melodious Warbler on Skokholm. — A Melodious Warbler (*Hippolias polyglotta*) was caught in the Garden trap on Skokholm on the afternoon of 3rd October 1955. Good field views were had on the morning of the 4th, just before it was recaught in the Heligoland trap. It was not found on the 5th, but was again captured, in the Winch trap, on the afternoon of the 6th. The completely brown upper-parts, rather pale under-parts, slightly abraded wing and tail feathers, and thick gape-flange, established that it was a bird of the year. The wing measurements were: curved 62 mm., straight 63.5 mm. Wing formula: 1st primary 6.5 mm. longer than primary coverts, 3rd and 4th longest, 2nd 4.5 shorter, 5th 1 shorter, 6th 4.5 shorter, 7th 7 shorter. Tail 46 mm. The weights at the time of its three captures were 10.2, 9.85, and 11.5 gm. respectively.

Both in the hand and in the field it seemed to me noticeably smaller than Icterine Warblers (*Hippolais icterina*) that I have handled. It was very "chiffchaff-coloured", and when pursued looked not unlike a phylloscopid in the way it perched, and flew from one tall bracken-stem to another, before diving into cover again. It was always flushed from the deepest cover.

This is the first record for Skokholm. PETER DAVIS

Short-toed Lark in Co. Wexford.—On 2nd October 1955, when on the North Slob, Co. Wexford, Mr. P. J. Roche and I disturbed a bird of which we had excellent views when it alighted in a very open space. Seeing it through binoculars at a range of less than 20 yards and with the light behind us, we easily identified it as a Short-toed Lark (*Calandrella brachydactyla*). We immediately had clear views of a prominent dark mark on the side of the base of the neck. This mark was persistently seen (in contrast to the difficulty I have experienced in detecting it in the Short-toed Larks observed at Great Saltee, *antea,* vol. xlvii, p. 442; vol. xlviii, p. 513).

The crown was darker than the nape and upper-parts; there was a darkish-buff eye-stripe. The upper-parts were not nearly so richly marked, nor could they be described as so sandy-looking in flight, as in the Saltee birds. The impression was that of a similarity to the upper-parts of the Meadow Pipit (*Anthus pratensis*). The faintest trace of a double wing-bar showed as a result of the palish tips of the wing-coverts. The under-parts were buffish white, especially on the flanks and were not, except for the centre of the belly, so markedly white as in the examples seen at Saltee. P. J. R. noted a faint buffish marking across the upper breast. In flight the tail showed darker than the upper-parts; there was some white on the outer feathers. The legs were yellowish. The bird was smaller than a Skylark (*Alauda arvensis*).

The call-note, which was what first drew our attention to the bird when disturbed, was quite unlike that uttered by Short-toed Larks encountered on Saltee and much more resembled that of a Yellow Wagtail (*Monacilla flava*). ROBERT F. RUTTLEDGE

REVIEWS

STATION BIOLOGIQUE DE LA TOUR DU VALAT: PREMIER COMPTE RENDU, 1950-1954, ET RECUEIL DES TRAVAUX. Published by Dr. L. Hoffman, at La Tour du Valat, par Le Sambuc, Boucher-du-Rhône, France.

IN VIEW of the ornithological interest of the Camargue attention should be drawn to this very interesting first report of the small research station founded and directed by Dr. Lucas Hoffman, with support from the Centre National de Recherche Scientifique. Most of the studies here reviewed are ornithological. During the period 11,680 birds were ringed, of which up to February 1955 1,420 had been retrapped, 119 recovered elsewhere in the Camargue and 179 recovered away from the Camargue. Flamingoes (nearly 2,000), Teal, Tree Sparrows, House Sparrows, Mallard, Magpies, Kingfishers and Blackcaps were, in that order, the most plentifully ringed species. Although it is too early to draw firm conclusions the general pattern of movements so far traced is north-eastward across Italy to Poland and Russia and south-westward to Spain and Africa, or even north-westward towards the Bay of Biscay in the case of certain autumn migrants. Enough Teal have been recovered during summer in Russia and Poland to point to that as their main native area, although one was recovered in Norway and some on subsequent autumn migrations in Denmark, the Netherlands and north France. About 50,000 Teal winter in the Camargue. Garganey occur on passage only; one ringed in March was reported in the Dolomites, 400 miles N.E., 8 days later. Nearly all the wintering Kingfishers ringed proved to be young birds; none breeds locally. The fifty pairs of breeding House Sparrows at Tour du Valat are increased during September-February by many immigrants, some of which are *Passer domesticus italiae,* one actually having been ringed and recovered near Turin the following spring. It is remarkable that all this activity has not so far produced a single recovery from the British Isles.

The Report gives a most valuable and fairly detailed Ornithological Calendar showing the main annual changes by fortnightly periods, with transect or census numbers of the more important species. Among wintering duck the Gadwall and Shoveler are next most abundant after Teal, while Mallard, Wigeon and Pintail are far less numerous. About 20 Chiffchaffs and occasionally a Wryneck winter on the transect area. Dartford Warblers leave by the end of February. Differences between conditions year by year are summarized, and this detailed picture is completed by notes on each of the species occuring regularly and in numbers on some 4 square km. at Tour du Valat, which is a small but fairly rich sample of the Camargue as a whole. Among points of interest it is noted that Marsh Harriers are fairly steady at 3-4 nesting pairs, and have diminished hardly if at all following myxomatosis among the rabbits. Red-legged Partridges have been diminishing for several years, and Lapwings lost about three-quarters of their breeding strength during the period, as also did Scops Owls. Wood Sandpipers with peaks of 250-300 (and occasionally up to 1,000) immensely outnumber Green Sandpipers on migration. About 50-100 Woodpigeons are noted regularly throughout the last quarter of the year. Bee-eaters leave with great punctuality about the 5th-9th September, which is nearly three weeks earlier than they left Sussex last year. Melodious Warblers do not arrive earlier than 27th April and leave again mostly before mid-August, with only exceptional records in September.

We look forward to further reports of these interesting studies, and of the calamitous mortality experienced by the Camargue during the past winter. E.M.N.

LOCAL REPORT REVIEWS

(Reviews of all the 1953-54 Reports will be appearing in the next few issues)

HEREFORDSHIRE ORNITHOLOGICAL CLUB, ANNUAL REPORT 1953 (31 pages) and 1954 (31 pages). Editor: R. H. Baillie, Wyche House, Kington, Herefordshire. Price 2s. 6d. each.

THE main item in each Report is the "Classified Notes", which are arranged in *Handbook* order in 1953, and in *B.O.U. Check-List* order in 1954. They cover the counties of Hereford and Radnor, and are compiled by a committee from the observations of a membership which by 1954 had progressed to a total of 150. They have the appearance of carefully prepared documents although there is no indication of the standards applied in accepting a record, nor—with hardly any exceptions—are details of identification given. All records of species having more than one race on the British List are unwisely assigned to a definite subspecies. As a result, for example, the unjustified claim is made that all Redwings recorded belonged to the race *musicus*.

The following are taken from the 1953 Report:—A party of 13 Ravens in January in Herefordshire. Between August and December parties of Crossbills were seen in 4 districts. Flock of about 300 Tree Sparrows in January. It is claimed that House Sparrow took possession of nest of Yellow Wagtail. Great Grey Shrike in January. 4 or 5 pairs of Marsh Warblers bred in areas previously occupied. A male Blackcap in January, and male and female in February, all in different areas. A pair of Black Redstarts in Radnorshire in April. A Hoopoe on the Hereford/Radnor border on 19th June. Little Owls showed first really marked increase since they were almost exterminated in the severe spring of 1947. Hobby bred. Probably 2 Hen Harriers in Radnorshire in December. Several Kites in Radnorshire. Ospreys in Herefordshire on 13th and 24th May, and one in Radnorshire on 11th June. 2 Whooper Swans in April. Gannet and Manx Shearwater in September. 2 Turtle Doves on 8th November. Great Black-backed Gull in Radnorshire in August. Quail heard in 2 areas.

The following are taken from the 1954 Report:—Storm Petrel on 30th November. A roost of 10 Cormorants in January. Common Scoter in Radnorshire on 16th August is first county record. A Pink-footed Goose was shot on 30th January. A claim to have seen 60 Brent Geese in flight on 8th and 21st February is square-bracketed, and might have been better omitted altogether; the observer's indentification notes are not given. 3 Kites reported in Radnorshire. Hobby again bred in Herefordshire and seen in Radnorshire. Red Grouse bred. Quail heard in June. A Spotted Crake found dead in March. Several reports of Corncrake. Curlew recorded wintering for the first time. Green Sandpiper in January. Knot on 1st February. Ruff in January/February. Great Black-backed Gull in Radnorshire in April. Lesser Black-backed Gulls wintered. Little Gull on 16th January. Kittiwake on 12th December. Long-eared Owl in Herefordshire in March and June, and a pair in Radnorshire in March. Hoopoe in April and May. A bird with very golden breast and brown wings seen perched on telephone wires is claimed as a Golden Oriole—but neither perch nor wing colour sound likely for this species. 22 Ravens in air at once in Radnorshire on 17th December. A party of some 15 Stonechats on 10th December. An abnormal number of Nightingales heard in May. 2 Marsh Warblers singing in early June, but, for first time since 1938, successful breeding not proved in Herefordshire. Starling feeding young in nest in January. Cirl Bunting in March.

All the occurrences listed above refer to Herefordshire unless otherwise stated. By no means all the species occurring regularly within the area are included in the Annual Reports, but this is perhaps hardly necessary in the present case as the general position is given in *Herefordshire Birds* published in 1941, and of which a revised and up-to-date edition appeared in 1954. P.A.D.H.

ORNITHOLOGICAL RECORD FOR DERBYSHIRE 1953 (15 pages, 2 tables) and 1954 (14 pages). Reprinted from the Journal of the Derbyshire Archaeological and Natural History Society. Compiler: Capt. W. K. Marshall, The Silver Hill, Radburne, Kirk Langley, near Derby. Price 2s. 6d. each.

THE Reports were compiled from the notes of 37 observers in 1953 and 40 observers in 1954. Though the 1953 report has over 15 pages, only about 6 are devoted to the systematic list. Of the balance 4 pages are occupied by arrival and departure dates, and 3 pages by notes from Barbrook reservoir. These last are supplied by 3 different observers, each of whose notes are listed separately and each published in a different way, one in diary form, one in tabular form with species in classified sequence, and one in tabular form under species in the order seen. There is no attempt at integration of the Barbrook reports, either with each other or with the main systematic list for the county. Thus several interesting species are not mentioned in the systematic list but appear in each of the 3 sets of notes for Barbrook reservoir. Furthermore, several species included in the migrants section are omitted from the systematic list. The arrival and departure dates of migrants are split into four groups, sandwiched between which are the Barbrook notes, and list of contributors. Thus one has to search through 6 or 8 different sections in this Report to find what has been recorded of a particular species. The search is made more difficult by the arrangement. The systematic list is in Wetmore order; the migrant lists are in no recognized order, but show affinities to the *Handbook* order; the sequences of the Barbrook notes have been mentioned above.

The 1953 systematic list includes the following:—Red-throated Diver in November (no date). 80-84 adult Great Crested Grebe on 16 waters (presumably a breeding season count, but this is not mentioned): first arrived 2nd February, and on 17th October a second brood was still being fed. An exhausted Manx Shearwater on 28th September. Throughout the 1952-53 winter a very tame bird roosted on a railway bridge which "certainly was a Shag and not a Cormorant". A pair of Common Scoters on 6th April. Buzzard attempted to breed at Buxton. Increase in breeding pairs of Curlew in more than one area. Green Sandpiper in winter. Dunlin throught to have bred in 2 localities. One Arctic Skua shot out of 3 on 3rd September. Black Tern on 16th August. 3 Water Pipits on 16th and 22nd November at Press reservoir. A

Crossbill on 29th July. The Barbrook notes include Little Stint and Little Tern in August and Bar-Tailed Godwit in September.

A number of records are undated. Increase or decrease is reported for many species, sometimes general but often for particular areas. For some species both increase and decrease is reported; no evidence is given and it is difficult to avoid the feeling that these records are of impressions, not facts, and one wonders whether they are well-founded. The Report is not one which should be taken as a model by other counties.

In the 1954 Report much more space is given to the systematic list; the migrant arrival and departure dates are reasonably restricted to little more than a page, but the sequence of species remains haphazard. Some notes are included on birds at opencast coal workings, but these are rather meaningless without any indication of the state and age of the workings. Two dawn chorus lists record the time of first call of a number of species; both lists are dated 6th June, but the times are about an hour apart because one list is given in B.S.T. and the other in G.M.T.

Most records are dated in the systematic list for 1954; the following items are extracted:—Red-throated Diver on 3rd April. 96 adult Great Crested Grebes in the breeding season; a very few wintered. Gannet on 21st September. A duck Goldeneye at Barbrook on 13th June. Velvet Scoter in December. Common Scoter in March, August and November. 42 Goosanders on 11th February. A record of 60 Pinkfooted Geese flying over on the very early date of 8th August is hard to accept without supporting evidence. 76 Bewick's Swans on 20th March. Corncrake heard in June. Oystercatcher in August. Curlew still extending breeding range in a number of areas. Wood Sandpiper in August. 2 Knots in October. A Stone Curlew on 7th November. Only 9 Herring Gulls recorded in the whole year. Kittiwake in April. A total of about 32 Black Terns on 9th May. Short-eared Owl from April to September. An undated Black Redstart. 2 pairs Pied Flycatchers feeding young: "species has been introduced by exchange of eggs just outside the county". Great Grey Shrike in February. No evidence is published in support of any of the above records except that of the Stone Curlew. P.A.D.H.

LETTERS

DISPLACEMENT COITION IN THE MALLARD

Sirs,—I read with interest Mr. W. G. Hale's note on " Displacement coition in the Mallard " (*antea*, p. 84). I think, however, that a different interpretation of the actions observed is rather more likely to be correct, i.e. that the sexual behaviour shown by the male Mallard was autochthonous and not displacement behaviour.

At least until the commencement of the moult into eclipse plumage Mallard drakes have strong sexual impulses and, when their mates are incubating, frequently pursue other ducks and attempt to rape them. As Heinroth long ago pointed out, the different manifestations of sexuality shown by the Mallard drake are of great psychological interest. Towards his own mate he is almost always " considerate " to a degree, whereas if he is sexually aroused by a strange female he makes completely uninhibited and brutal assaults on her. Under natural conditions this behaviour is not harmful to the species, since it tends to cause a spacing out of the breeding pairs and its potential evils are thus mitigated. Where man, by destroying predators and supplying food, has caused an abnormally high density of breeding Mallard, such behaviour occasions much suffering and sometimes results in the death of individual females. In Inner London, for example, incubating females that leave the nest for food or water are often harried unmercifully and become the centre of a "rugger-scrum" of twenty or more frenzied drakes, few of whom will desist till they have succeeded in treading her. Usually the female's own mate—if present, as he often is—is " on her side " and may even attempt to fight off her attackers. Occasionally in this situation his sexual impulses get the upper hand and he may dislodge one of her ravishers only to follow his example!

I have noticed, however, that even when this sort of behaviour is at its height, female Mallard with small young are very seldom molested, and never, in my experience, with any degree of persistence. This suggests that the presence of ducklings inhibits the Mallard drake from making sexual attacks on their mother. Such a " safety-mechanism " might be expected, for whereas, under natural conditions the incubating female—if pursued when off the nest—can usually escape from the two or three drakes that are the most that are likely to chase her, and even if caught suffers no serious damage, the case would be very different with a female with small young.

With the above in mind I would suggest the following explanation for the behaviour observed by Mr. Hale:—A female Mallard, accompanied by her young had attracted the interest of a drake, possibly, but by no means certainly, her own mate. This drake was inhibited from overt sexual behaviour towards her by the presence of the ducklings. The drake's attacking of individual ducklings that strayed far from the mother might be due to their then being considered by him (as would a sparrow in the water, a frog, or a mouse) as prey. Alternatively, aggressiveness (? caused by sexual frustration) might be vented on the lone duckling rather than on the many around the mother, owing to the latter being defended by her. The two explanations are not, perhaps, mutually exclusive, since in the Mallard it is not always clear where re-directed aggression (which is habitually shown by London Mallards towards many species of smaller waterfowl, pigeons, and other birds) ends and food-seeking predatory behaviour begins.

The drake's attack on the duckling and/or the presence of the observer elicited an aggressive approach (? or distraction display) from the female. Her moving away from the brood " permitted " her to be regarded by the drake as an object of sexual attack and he reacted accordingly.

The above suggestions are offered very tentatively, since I am well aware of the dangers inherent in trying to interpret a piece of bird behaviour that one has not personally witnessed. It is to be hoped that any other readers who chance to see similar behaviour will also record it in detail. It would be particularly worthwhile to know if any Mallard drakes do, in fact, show any real solicitude for ducklings. I have never seen any indication that they do. Most male Mallards take almost as active a role as the ducks in seeking out suitable nesting sites, but, once laying commences, their interest in the nest and its contents seems to evaporate. DEREK GOODWIN

YELLOW WAGTAILS IN KENYA

SIRS,—With reference to Mr. D. I. M. Wallace's paper on Yellow Wagtails (*Motacilla flava*) in Kenya (*antea*, vol. xlviii, pp. 337-340), I have nothing to add to my remarks on this species in *The Birds of Arabia*. There is one point, however, which I wish to make. Wallace talks of the possibility of *flavissima* occurring in Kenya, whilst recording three specimens observed at Meru. This "possibility" is actually a certainty for V. G. L. Van Someren (*Novit. Zool.*, 1922, p. 183) obtained 14 adult males in Kenya (now in New York ex Tring) and I have in my collection two males from Kisumu on the Victoria Nyanza, dated 30th March 1916. At Entebbe (on the Victoria Nyanza) where the congregation of many races occurs in spring, I estimated that *flavissima* were in hundreds. The adult males cannot possibly be confused with *lutea* and when in such numbers, cannot be accounted for by genetical instability. I was at Meru in Kenya in March 1956 and saw two undoubted males of *flavissima*.

But whilst all these sight records and specimens show that birds identical with British *flavissima* do in fact occur in Kenya, it remains to be proved that they are a part of the British population.

One other point. Van Someren (*op. cit.*) obtained three Yellow Wagtails with white heads and I obtained one with a white head in Egypt. None of these are *leucocephala* nor even *beema*. In these specimens the mantle is not pale as in *beema* but dark as in *M. f. flava*, and I have always considered them to be aberrant *M. f. flava*.

The Yellow Wagtail complex remains unsolved, the greatest confusion occurring in Southern Russia. An accurate survey of the species in this area of greatest confusion would perhaps solve the problem but would not convert those whose views on " overlap " are adamant. R. MEINERTZHAGEN

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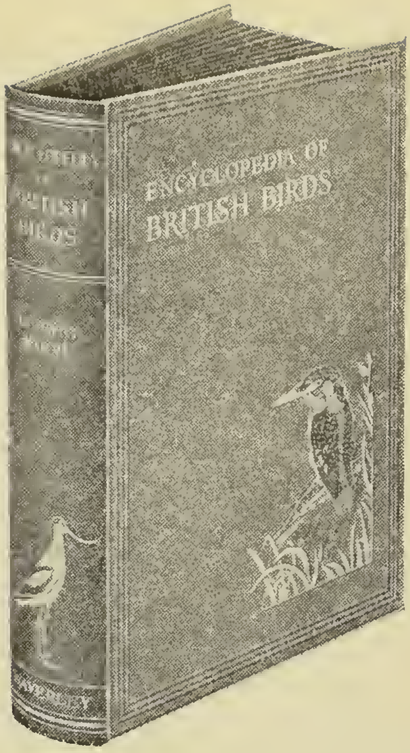

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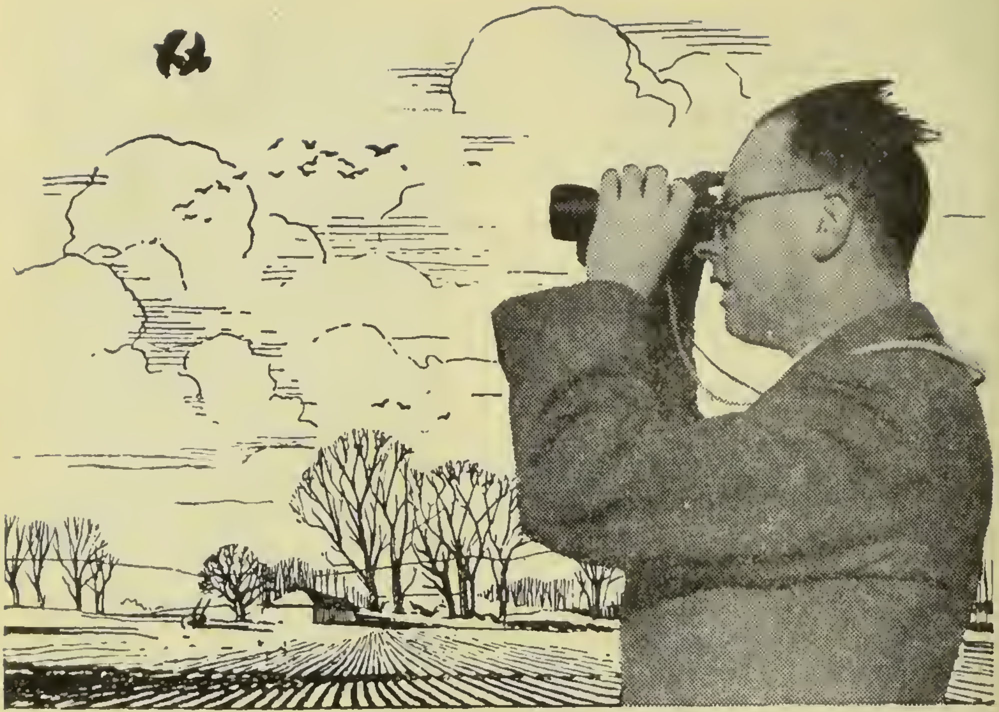

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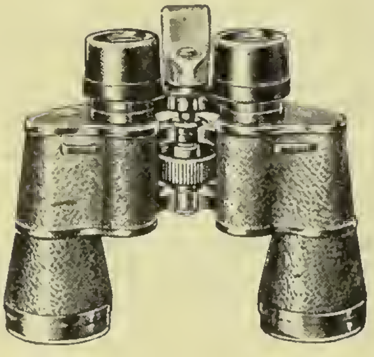

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1956

BRITISH BIRDS

AN ANALYSIS OF THE WEIGHTS OF BIRDS TRAPPED ON SKOKHOLM

By K. and E. Browne

INTRODUCTION

At the Bird Observatory at Skokholm (which is a small island situated off the Pembrokeshire coast) many thousands of birds have been trapped and ringed since the war and the opportunity has been utilised, at the same time, to take weights and other measurements. The data presented in this paper relate to the years 1947-53; during this time, with Mr. Peter Conder as the island's warden, over four thousand birds of different species have been weighed.

In nearly all cases the birds have been captured in the conventional funnel-shaped " Heligoland " traps, in which the birds are at complete liberty until the final moment when they are "walked" into the funnel leading to the cage from which they are immediately removed. Therefore the large losses in weight known to take place when wild birds are held in close confinement in a trap for any length of time (Lees, 1949) will not normally have occurred in this series, and apart from the small loss from defecation (of the order of 1% in small birds—Baldwin and Kendeigh, 1938) the weights used should be representative of true weights in the field. The birds have been weighed in a beam scale accurate to within 0.1 gm.

The Observatory has, since 1947, been occupied only from late March to early October and all weighings have therefore been confined to this part of the year.

GENERAL RESULTS

Table I gives the average weights for all species recorded, together with the range. Apart from Meadow Pipits, Rock Pipits and Wheatears the great majority of weighings were made of birds on spring and autumn passage and it was therefore felt desirable to give averages for juveniles and first-winter birds separately from those of adults. Where, as often happened, individual birds were trapped more than once, only the initial weight has been included in the averages. It will be seen from this Table that only eight species, namely Meadow Pipit, Rock

Pipit, Spotted Flycatcher, Chiffchaff, Willow Warbler, Sedge Warbler, Whitethroat and Wheatear were weighed in sufficient numbers to permit more detailed analysis. The remainder of this paper is therefore devoted to a closer consideration of the data relating to these species.

TABLE I—THE AVERAGES AND RANGES OF WEIGHTS (IN GM.) OF BIRDS TRAPPED ON SKOKHOLM, PEMBROKESHIRE, 1947-53*

	Adults			*Juveniles and 1st winter*		
	No.	*Av. wt.*	*Wt. range*	*No.*	*Av. wt.*	*Wt. range*
Storm Petrel	28	26.5	19.7-39.6	7	31.0	28.1-34.0
Sparrowhawk (all ♀)	2	279.7	256.3-303.0	1	216.6	—
Quail	1	138.9	—	—	—	—
Corncrake	4	132.7	119.5-143.6	—	—	—
Oystercatcher	—	—	—	2	380.6	355.6-405.6
Snipe	1	119.4	—	1	89.1	—
Common Sandpiper	2	48.6	45.2-52.0	—	—	—
Dunlin	2	50.9	41.9-59.8	1	47.9	—
Sanderling	1	31.7	—	—	—	—
Lesser Black-backed Gull	—	—	—	1	533.7	—
Puffin	22	385.8	338.0-432	—	—	—
Turtle Dove	6	134.4	118.9-151	—	—	—
Cuckoo	3	103.2	98.0-108.4	4	90.0	75.4-111.8
Little Owl	3	188.1	175.6-205.7	—	—	—
Nightjar	2	77.3	72.7-81.9	—	—	—
Kingfisher	—	—	—	1	37.9	—
Wryneck	1	33.2	—	—	—	—
Short-toed Lark	1	18.1	—	—	—	—
Skylark	—	—	—	2	35.4	35.2-35.6
Swallow	5	19.4	15.1-20.0	1	17.1	—
Jackdaw	4	211.7	196.7-220.6	—	—	—
Blue Tit	3	9.9	9.6-10.6	—	—	—
Wren	18	9.5	8.6-11.7	8	9.4	8.4-11.1
Song Thrush	—	—	—	2	74.2	74.1-74.3
Redwing	2	81.8	75.5-88.2	—	—	—
Blackbird	4	96.4	87.0-109.0	—	—	—
Wheatear	22	25.2	21.4-29.6	172	25.5	20.2-29.2
Greenland Wheatear	9	26.6	24.8-31.6	1	36.7	—
Stonechat	3	15.5	14.0-17.4	5	15.5	14.7-17.4
Whinchat	14	17.2	14.4-20.2	3	16.9	15.3-19.1
Redstart	20	14.2	12.2-16.1	13	14.8	13.5-16.7
Black Redstart	7	16.0	14.8-17.4	1	16.9	—
Nightingale	1	19.5	—	—	—	—
Robin	13	17.7	13.8-22.2	46	17.9	15.5-21.3
Grasshopper Warbler	32	12.9	11.0-15.6	1	12.6	—
Reed Warbler	1	7.2	—	—	—	—
Sedge Warbler	232	11.2	8.1-17.9	11	11.3	10.0-16.9
Aquatic Warbler	1	14.0	—	—	—	—
Olivaceous Warbler	1	12.3	—	—	—	—

* Because so little information on the weights of birds has been published, this table includes details of *all* species weighed on Skokholm, though in many cases the number of individuals involved is very small and for 16 of the species there is only one record available. It cannot be over-emphasized, however, that great caution is necessary when making use of these average weights, for, as is discussed in the text, the variation within a species can be very large.

	Adults			*Juveniles and 1st winter*		
	No.	*Av. wt.*	*Wt. range*	*No.*	*Av. wt.*	*Wt. range*
Blackcap	12	17.0	15.9-20.0	—	—	—
Garden Warbler ...	11	15.9	14.9-18.2	4	19.7	15.1-23.8
Whitethroat	828	13.7	10.6-19.3	78	16.3	12.1-23.4
Lesser Whitethroat ...	3	10.2	9.0-11.5	—	—	—
Subalpine Warbler ...	—	—	—	1	9.7	—
Willow Warbler ...	723	8.7	6.5-11.8	729	9.1	6.3-11.9
Chiffchaff	101	7.5	5.7-9.2	23	7.9	6.8-8.9
Wood Warbler ...	—	—	—	1	10.1	—
Goldcrest	15	5.4	4.8-6.2	1	5.6	—
Spotted Flycatcher ...	76	14.6	12.2-17.0	48	14.5	12.8-17.8
Pied Flycatcher ...	5	11.9	11.3-12.7	18	12.6	9.1-15.2
Dunnock	5	20.7	19.5-22.8	3	19.2	18.5-20.2
Meadow Pipit ...	125	18.8	15.2-21.8	675	18.4	13.9-23.4
Tree Pipit	3	21.3	17.6-22.9	4	22.4	19.5-25.1
Rock Pipit	7	24.6	22.7-25.7	228	24.5	19.6-30.5
Pied Wagtail	2	21.5	20.6-22.4	9	24.1	22.2-27.0
Grey Wagtail ...	1	14.0	—	—	—	—
Yellow Wagtail ...	1	20.3	—	7	18.0	15.1-19.2
Woodchat Shrike ...	2	33.3	31.4-35.2	2	28.5	28.2-28.8
Red-backed Shrike ...	—	—	—	1	29.2	—
Starling	6	80.2	75.7-89.9	32	70.3	56.5-79.7
Greenfinch	7	26.7	25.5-28.4	—	—	—
Goldfinch	4	15.1	12.9-17.8	—	—	—
Linnet	3	18.2	16.4-20.0	—	—	—
Lesser Redpoll ...	2	12.6	10.9-14.3	—	—	—
Chaffinch	4	21.6	18.6-23.5	—	—	—
Yellowhammer ...	3	24.4	23.1-26.4	—	—	—
Rustic Bunting ...	1	19.2	—	—	—	—
Reed Bunting ...	2	17.4	16.7-18.1	—	—	—
Tree Sparrow ...	1	23.2	—	—	—	—

VARIATIONS IN WEIGHTS WITHIN SPECIES

As Baldwin and Kendeigh (1938) in their important paper on the subject of weights have pointed out, "most students, especially those who have weighed living birds and often the same individual at different times, are impressed with the great variability in their weights". This has certainly been the case in the present study, both as regards different individuals of the same species and the same individuals weighed on different occasions.

It will perhaps make the subsequent analysis clearer if the reasons for this variability are recounted. Differences between ndividuals of the same species may be due firstly to a difference between the sexes, secondly to the inclusion of more than one subspecies with different average weights (or of a cline covering a range of weights) and lastly to the normal variation between different individuals which may or may not be found to be correlated with differences in other measurements such as length of wing, bill, tarsus, etc. Then the weight of any given individual will fluctuate considerably as a result of diurnal variations, seasonal variations, the process of maturation from fledgling to uvenile to adult and perhaps also year to year differences in mature birds resulting either from the normal process of ageing or from irregularities in the environment, such as different climatic conditions and food availability.

The information relating to each of these factors which can be obtained by statistical analysis of the weights is set out in detail below. But first some examples may be given to illustrate the great variations which are encountered. An adult Whitethroat in the autumn of 1951 was recorded as weighing 10.8 gm. while a juvenile of the same species captured at about the same time weighed 23.2 gm. Sedge Warblers on spring migration have ranged from 8.1 to 17.9 gm. and other species show similar extremes. Groebbels, quoted by Baldwin and Kendeigh, states that small birds tend to vary more than large birds. This is certainly true in our experience, as can be seen from both the ranges and standard deviations given in the tables, the latter having been calculated where the numbers were sufficient and the homogeneity of the data such as to make it appropriate. Extremes of individual variations are provided by birds trapped and weighed on more than one occasion. A juvenile Starling captured at the end of June 1949 weighed 64.9 gm. and when recovered eleven days later weighed 77.1 gm., an increase of nearly 20%. A Chiffchaff weighed 5.7 gm. at the end of March 1950; three days later it weighed 7.3 gm., an increase of just under 30%. A Willow Warbler weighing 9.7 gm. in May 1949 had fallen to 8.1 gm. five and a half hours later on the same day, a fall of 17%, while a Whitethroat similarly lost over 10% in weight within seven hours. It may be surmised that some of these extreme changes, especially falls occuring in spring-passage birds which, as is discussed below, appear not to feed to any great extent on Skokholm, are due to disease. This is another reason for weight variation and one which can cause great difficulty when information relating to normal birds is being sought by methods of averaging.

FREQUENCY DISTRIBUTION OF WEIGHTS

As a first step in the analysis it was found useful to arrange the data for each species in the form of a frequency distribution, a device which can be very useful in detecting non-homogeneity of data such as might arise, for example, from the inclusion of different subspecies, or in the case of spring-migrants, from substantial differences in the length of journey covered before arrival at Skokholm (resulting from differences in winter territories). Fig. 1 is a histogram illustrating the frequency distribution of weights of spring-migrant Willow Warblers, while Fig. 2 shows in graph form the frequency distributions for six of the seven other species being considered in detail.

It can be seen that the frequency distributions for adult Whitethroats, Willow Warblers, Sedge Warblers, Chiffchaffs, Spotted Flycatchers and juvenile Rock Pipits all appear to be bi-modal. The most obvious interpretation of this feature of the curves is that they include more or less equal numbers of both sexes, with slightly different average weights. Confirmation of this is available in the case of Whitethroats where a certain number of birds

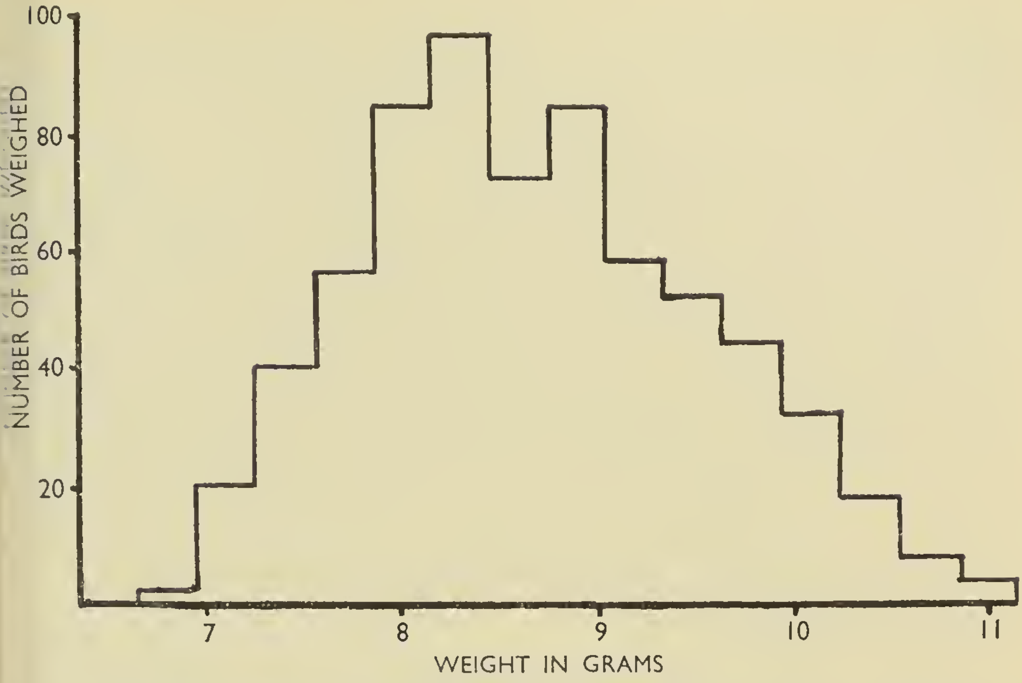

FIG. 1—FREQUENCY DISTRIBUTION HISTOGRAM OF THE WEIGHTS OF ADULT WILLOW WARBLERS (*Phylloscopus trochilus*) TRAPPED ON SKOKHOLM IN SPRING (see page 251)

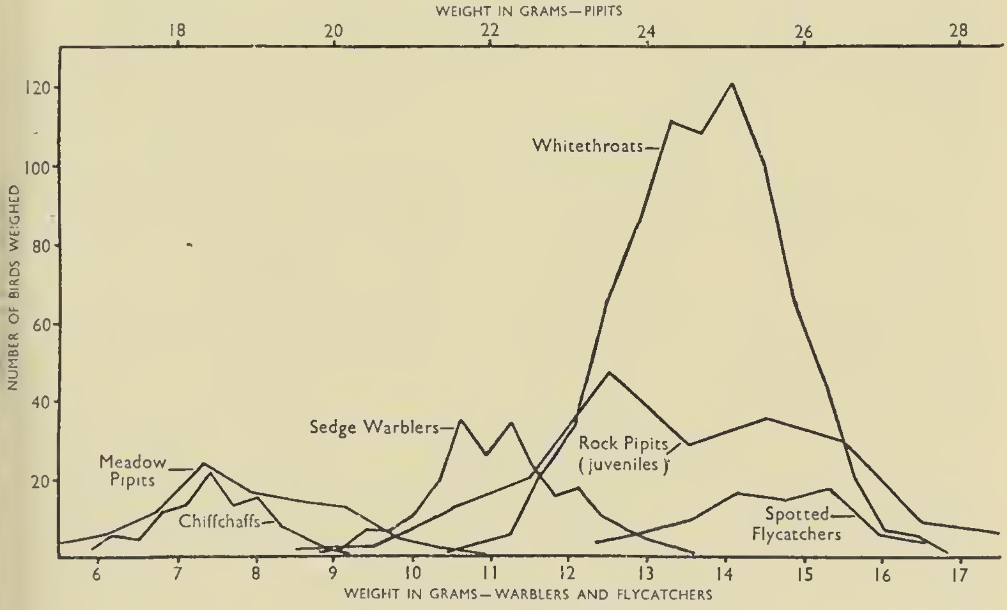

FIG. 2—FREQUENCY DISTRIBUTIONS OF THE WEIGHTS OF SIX SPECIES TRAPPED ON SKOKHOLM

The top horizontal scale refers to adult Meadow and juvenile Rock Pipits (*Anthus pratensis* and *spinoletta*); the bottom scale to adult Chiffchaffs (*Phylloscopus collybita*), Sedge Warblers (*Acrocephalus schoenobaenus*), Whitethroats (*Sylvia communis*) and Spotted Flycatchers (*Muscicapa striata*) (see pages 253-256).

were sexed at the time of weighing. In the case of some other species it is found that the heavier birds tend to arrive before the lighter birds. It has been shown (May, 1948 the male Willow Warblers arrive in S. England about a fortnight before females and it is therefore reasonable to conclude that the twin peaks of the Willow Warbler distribution reveal a difference in the weight of the two sexes. This is further confirmed by an examination of wing-length which for most Willow Warblers provide reliable evidence of sex (Williamson and Butterfield, 1954). The same hypothesis may be extended to the remaining bi-modal curves in the absence of good evidence to the contrary. The actual numerical interpretation of the difference will be discussed under the individual species headings below. No very definite suggestions emerge with regard to the inclusion of subspecies but with the exception of Willow Warblers and Whitethroats the numbers concerned are too small to reveal any but gross differences.

VARIATIONS DUE TO GROWTH AND SEASONAL CHANGES

1. *Passage-migrants.*

As far as small migrants are concerned it is unfortunate that for the most part adult birds pass through Skokholm only in the spring. In the case of Willow Warblers alone has any number of autumn adults been recorded. With this species autumn adults have been shown to be significantly heavier than birds captured on spring passage, the difference of 6% being statistically significant ($p < .01$). Small samples of other species are in agreement with this conclusion, without, however, being sufficient in number to exclude chance. Since there is now strong evidence for believing that migrant Passerines show a sudden increase in weight just prior to migration (Wolfson, 1945; Odum, 1949), probably feed little on the journey, at least in the late stages and are known to lose considerable weight in long overseas flights (Butterfield, 1952a), these findings are to be expected.

It was found that juveniles on autumn migration are also almost always higher in weight than the parent birds in spring. As before, however, a comparison with autumn adults can only be made for Willow Warblers. In 1948 60 adult Willow Warblers were captured on autumn passage, their average weight being 9.31 gm. ($\sigma = .65$) while 436 juvenile birds were trapped, giving an average weight of 9.15 gm. ($\sigma = .75$). The difference between these two means is significant at the 5% level. In 1952 14 adults had the same average weight as 93 juveniles, while in 1953 5 adults had a substantially higher average weight than 33 juveniles (Table VI). Once again small numbers of weights of other species are substantially in agreement. It may be concluded then that autumn adults are possibly slightly heavier than juveniles, but this could be due to a tendency for adults to pass through Skokholm slightly later than juveniles.

2. *Residents.*

The island's resident population provides a rather more complete picture of the pattern of weight changes throughout life. Information as regards nestlings is still rather fragmentary but suggests that most nestling pipits and Wheatears, particularly those which survive to a normal juvenile existence, attain a weight as high as or rather higher than that of their parents before leaving the nest, a finding in agreement with that for Robins by Lack and Silva (1949) and Lees (1949). The figures given in Table II relate to sample weighings made during the course of ringing operations and other work on birds at the nest. These average weights are below the maximum since continuous weighings were usually not made and while the birds were in all cases well advanced, they were certainly not all at their peak weight; moreover, the averages include one or two very low weights and it is probable that some of these nestlings did not survive to the fledgling stage.

TABLE II—WEIGHTS (IN GM.) OF NESTLING WHEATEARS (*Oenanthe oenanthe*) AND PIPITS (*Anthus* spp.), SKOKHOLM, 1947-53.

	No.	*Av. wt.*	*Wt. range*
Wheatears	89	25.5	19.5-29.9
Meadow Pipits	15	18.0	15.8-20.5
Rock Pipits	4	25.5	23.8-27.4

From the time of leaving the nest weights appear to fall quite sharply at first then rise again until the time of the first moult. This appears to coincide with another temporary fall, after which there is a rise to a level higher than that immediately preceding the moult. In Table III the weights of juvenile Meadow and Rock Pipits trapped during 1947-50 have been grouped into three-weekly time-periods. For Meadow Pipits the difference between successive periods is in each case statistically significant ($p. < .01$). Rock Pipits show an identical change but in numbers too small by themselves to exclude chance.

TABLE III—SEASONAL CHANGES IN WEIGHTS (IN GM.) OF JUVENILE PIPITS (*Anthus* spp.), SKOKHOLM, 1947-53

	Date	*No.*	*Av. wt.*
Juvenile Meadow Pipits ...	June 17-July 7	68	17.9
	July 8-July 28	48	18.7
	July 29-Aug. 18	110	18.2
	Aug. 19-Sept. 8	98	18.8
	Sept. 9 onwards	62	19.2
Juvenile Rock Pipits ...	June 10-June 30	30	24.25
	July 1-July 21	14	24.6
	July 22-Aug. 11	25	23.2
	Aug. 12-Sept. 1	56	25.0
	Sept. 2 onwards	21	25.4

Further confirmation of this cycle of weight changes can be obtained from re-trapped juvenile Wheatears. Of 23 juvenile

Wheatears re-trapped at intervals of more than a week only 6 showed a fall and in each case the period between weighings coincided approximately with the time covered by the moult.

Thirty Meadow Pipits trapped and weighed as juveniles before the first moult averaged 18.3 gm.; when trapped in the following spring their average weight was 19.2 gm., the difference being highly significant statistically, as is also the difference between the average weight of all Meadow Pipits trapped as juveniles and that of those trapped as spring adults (Table XI). It is therefore safe to assume that, after the initial fall from the high nestling weights, juveniles do not achieve a weight as high as the spring adult average, at least until after their first moult. The high averages for September, on the other hand, suggest that for pipits as for Chaffinches (Butterfield, 1952b) there is no significant difference between the weights for adults and first-winter birds.

These changes correspond well with the picture of seasonal variations in the weight of resident Passerines which is emerging as a result of research on this subject in many quarters. It is not proposed here to review the literature, the important references to which have recently been given by Owen (1954), but the picture is one of a maximum adult weight achieved during the winter months (the exact peak probably varying according to year-to-year temperature differences) followed by a gradual decline through the spring and summer, possibly interrupted temporarily in the case of egg-laying females, and culminating in a sharper fall about the middle of the summer. Despite the contrary view expressed by Baldwin and Kendeigh it is felt that the sharp drop in weight occurring during the summer, such as is shown in the above Tables, must be associated with moulting, being too sharp and too circumscribed to be due merely to temperature variation.

Re-trappings also enable a comparison to be made between weights of adults in their first, second and third years of adult life. Averages for the first and second years were identical, but 6 birds trapped in what was known to be their third adult season averaged 20.5 gm. The probability that the difference between this figure and the average for all adult Meadow Pipits (18.8 gm.) is due to chance is too high to enable the assertion to be made with any confidence that Meadow Pipits are subject to "middle-age spread". Nevertheless the point is one worth bearing in mind for further investigation.

DIURNAL VARIATIONS

A study of the weights of juvenile pipits also provides some interesting information on diurnal variations. The weights of both Meadow and Rock Pipits were classified separately into four time-periods and averaged, with results seen in Table IV. The figures show remarkable uniformity considering that the numbers are not large. (An analysis of variance left no doubt that the trend was significant and not due merely to chance; for 1948 alone, $p < .001$.)

LE IV—Diurnal variation in weights (in gm.) of juvenile pipits (*Anthus* spp.), Skokholm, 1947-53

	(*A*) *up to* 0900 *hrs.*		0901 *hrs. to* 1200 *hrs.*			1201 *hrs. to* 1800 *hrs.*			*After* 1800 *hrs.*		
	No.	*Av. wt.*	*No.*	*Av. wt.*	% *change on* (*A*)	*No.*	*Av. wt.*	% *change on* (*A*)	*No.*	*Av. wt.*	% *change on* (*A*)
low Pipits											
1948	50	17.9	91	18.0	+1	58	18.7	+5	36	18.6	+4
1949	35	17.9	37	18.1	+1	48	19.1	+7	16	18.5	+4
1948/9	85	17.9	128	18.0	+1	106	18.9	+6	52	18.6	+4
Pipits											
1948/9	45	24.4	56	24.3	—	21	25.2	+3	20	24.8	+2

This picture is substantially in agreement with that given by Baldwin and Kendeigh (1938), and other observers cited by them, although not all have found a drop in the early evening. However, the duration of daylight must be taken into account; in winter these pipits, like the tits measured by Owen (1954), would no doubt continue to increase in weight until dark.

In the case of Skokholm weights, as with most others, the earliest weighings do not take place before about 7.30 a.m., B.S.T., so that birds will, in most instances, already have spent a considerable time feeding and the percentage shown in Table IV therefore by no means represents the full extent of variation. As might be expected from the data presented in the next section, birds trapped on passage show no correlation at all between weight and time of day.

THE BEHAVIOUR OF SPRING-PASSAGE BIRDS

Birds trapped more than once while on spring passage have provided some interesting information on the behaviour of spring-migrants on Skokholm. The most important point which emerges is the low average weight of birds re-trapped one or more days after the original trapping. Table V shows that the weights of Willow Warblers, Chiffchaffs, Whitethroats and Sedge Warblers re-trapped on the same day as the original weighing are almost identical with the averages for the whole species, the small differences falling well within the limits of sampling errors. The average initial weights, however, of birds re-trapped after an interval of one or more nights are very much below the species' average, the difference being undoubtedly significant. Of 17 Willow Warblers re-trapped on the day after the initial weighing (which in almost all cases will have been the day of arrival) only 4 had an initial weight above the average for the species and among 8 re-trapped birds in the remaining three species only 2 were above average; the average weight of these 25 birds was 7% below that for their species. Ten birds from among these four species were re-trapped after periods ranging from two to seven days (the average duration of stay was 3·3 days) and these birds had an average weight even lower, by 10%, than the species' average.

TABLE V—CHANGES IN WEIGHTS (IN GM.) OF RECAPTURED SPRING PASSAGE BIRDS, SKOKHOLM, 1947-53

	No.	*% difference av. initial wt. and av. for species.*	*Av. wt. change as % of initial wt.*	*Standard deviation of wt. change*
Birds recovered on the same day as original weighings:				
Willow Warblers and Chiffchaffs	88	+1%	+1.6%	3·3%
Whitethroats	66	+1%	- ·4%	3.8%
Sedge Warblers	24	nil	+ ·7%	2.6%
Birds recovered on the following day	25	- 7%	+1·5%	—
Birds recovered more than 1 day later	10	-10%	+8%	—

It will be seen from Table V that Willow Warblers and Chiffchaffs re-trapped on the same day as their first weighing show very slight increases in weight on the average, while Whitethroats show a slight decrease. Although the average interval between trappings was just under four hours the changes are smaller than might be expected from normal diurnal variations. What significance is to be attached to this observation is uncertain. Trapping and weighing might be expected to have some effect on feeding-behaviour and weight-change, though in the Skokholm traps these birds are not imprisoned until the moment before they are actually taken in hand and they are usually liberated again within a very few minutes. And on the other hand small birds such as these would arrive with an alimentary tract virtually empty (Stevenson, 1933) so that any food ingested would initially represent a pure weight-gain. Two other facts suggest that what feeding does take place on the day of arrival is of a rather desultory nature and less in amount than normal daily feeding. Firstly, as was mentioned above, no correlation could be obtained between weight and time of day for birds trapped on spring-passage, such as was found for resident birds. Secondly, birds which were re-trapped on the day following the initial weighing (but not again subsequently) showed a weight increase of only 1½% in spite of the fact that they were on the average very underweight and that the average time of trapping was slightly later on the second day than on the first. On the other hand, those birds which stayed several days on Skokholm, starting with an even lower initial weight, recorded a considerable gain almost sufficient to restore them to normal (Table V).

From this we may deduce that only those birds tend to stay overnight on Skokholm which have had a difficult migratory journey or for any other reason are feeling more than usually weak on arrival. For those which stay only for one night the pause is for rest rather than refreshment; those which stay longer have arrived in an even more exhausted or emaciated condition and feed substantially before continuing their journey. It may be noted that the difference between the average weight-change shown in Table V by Whitethroats re-trapped on the same day and those of other species is significant ($p < .005$). This suggests that Whitethroats feed less than the other species owing perhaps to the nature of the available food, or more probably (since several Whitethroats are included among those which stayed for several days, increasing their weight considerably in the process), owing to their slightly larger size and consequent ability to travel further without food.

NOTES ON INDIVIDUAL SPECIES

1 *Willow Warblers.*

The frequency distribution of spring adults (Fig. 1) is bi-modal and, as suggested above, is probably due to the fact that males and females are of different average weights. A difference of about 0.8 gm. is suggested. Table VI contains an analysis of the weights by time of arrival and shows quite clearly that heavier birds tend to arrive earlier. No definite estimate of an average time difference can be given, particularly in view of the fact that it has been shown (May, 1949) that males tend to arrive over a rather longer period than females. However, the Skokholm data can be said to be roughly in agreement with the difference mentioned by May of ten days to a fortnight between the time when most of the males have arrived and the arrival of the main body of the females.

TABLE VI—WEIGHTS (IN GM.) OF WILLOW WARBLERS (*Phylloscopus trochilus*), SKOKHOLM, 1948-53

		No.	*Av. wt.*	*Stnd. devn.*	*Wt. range*
1948	Spring adults 4th week ...	81	9.5	—	—
	5th week ...	83	8.8	—	—
	6th week and after	26	8.4	—	—
	Total spring adults	190	9.0	1.17	—
	Autumn adults	60	9.3	.65	—
	Autumn juveniles and 1st winter	436	9.15	—	—
1949	Spring adults 7th week	44	8.4	—	—
	8th week ...	12	8.8	—	—
	9th week ...	24	8.6	—	—
	Total spring adults	80	8.5	.66	—
	Juveniles	101	8.77	—	—
1950	Spring adults 1st-4th week ...	29	9.3	—	—
	5th and 6th weeks	64	8.4	—	—
	7th and 8th weeks	17	8.3	—	—
	Total spring adults	110	8.6	.85	—
	Juveniles	33	8.9	—	—

		No.	*Av. wt.*	*Stnd. devn.*	*Wt. range*
1951	Spring adults 4th week	23	9.5	—	—
	5th week	40	8.25	—	—
	6th and 7th weeks	17	8.3	—	—
	Total spring adults	80	8.6	.71	—
	Juveniles	33	9.2	—	—
1952	Spring adults 3rd-4th week	29	8.9	—	—
	5th week	34	8.1	—	—
	6th week and after	21	8.1	—	—
	Total spring adults	84	8.4	.83	—
	Autumn adults	14	8.9	—	—
	Juveniles	93	8.9	—	—
1953	Spring adults 4th week	8	9.3	—	—
	5th week	31	9.6	—	—
	6th week	22	8.3	—	—
	7th week	31	8.1	—	—
	8th and 9th weeks	8	7.6	—	—
	Total spring adults	100	8.4	.95	—
	Autumn adults	5	9.5	—	—
	Juveniles	33	8.8	—	—
1948/53	Total spring adults	644	8.7	.86	6.5-11.8
	autumn adults	79	9.2	.7	7.1-11.1
	all adults	723	8.7	.92	6.5-11.8
	juveniles	729	9.1	.75	6.3-11.9

In an examination of wing-lengths of spring-migrants passing through Great Saltee, Williamson and Butterfield (1954) showed that these could represent an aggregation of two frequency distributions, that of males having a mean length of 68.00 mm. with range of 66-71 mm., and that of females having a mean of 62.84 mm., range 60-66 mm. The weights of birds trapped on Skokholm in 1950 and 1951 (two fairly normal years) were therefore classified according to wing-measurements to discover whether this method of sexing gave results in agreement with the observations already made. The average weight of all birds of wing-length 67 mm. and over was 9.3 gm. while that of birds of wing-length less than 66 mm. was 8.2 gm., harmonising well with the general picture though suggesting a rather greater difference between the average weight of the two sexes. However, the frequency distribution of wing-lengths of female birds in 1951 appeared to be centred around a mean rather higher than that given by Williamson and Butterfield, no less than 15 birds, most of them undoubtedly female to judge from other evidence, having a wing-length of 66 mm. compared with 36 birds having a wing-length less than this, so that average weights based on this method of sexing are also liable to some inaccuracy.

If the hypothesis regarding the sex-difference is correct it can further be deduced from the table that the proportion of males and females varies from year to year; in particular in 1949 males appear not to have reached Skokholm in any numbers, as testified both by the late time of arrival and the low average weight. The frequency distribution (Fig. 1) also suggests that more females than males pass through Skokholm.

2. *Whitethroats.*

The frequency distribution suggests a difference of about 0.6 gm. between the average weights for the sexes (Fig. 2) and this estimate is corroborated by the difference in the averages of birds whose sex was recorded. An analysis of arrival times does not suggest any definite difference between the two sexes. The average weights in 1948 and 1949 (Table VII) are significantly greater than those for the remaining four years, a fact which is very difficult to explain if the sexes tend to arrive simultaneously, unless it is due to differences in the numbers of birds passing through Skokholm from different winter-quarters, under the influence of weather factors. In view of this it is perhaps worth describing the differences in arrival times: in 1948 arrivals were fairly evenly spread over the first three weeks of May; in 1949, the year in which abnormally large numbers were recorded, most birds arrived in a small wave about 2nd May and a very large wave about the 17th. In 1950 migration was centred fairly closely around 9th-10th May. In 1951 it was widely spread over five weeks from 19th April.

TABLE VII—WEIGHTS (IN GM.) OF WHITETHROATS (*Sylvia communis*), SKOKHOLM, 1948-53

		No.	*Av. wt.*	*Stnd. devn.*	*Wt. range*
1948	Spring adults	99	14.0	—	—
	Juveniles	20	15.3	—	—
1949	Spring adults	249	14.1	—	—
	Juveniles	16	15.9	—	—
1950	Spring adults	110	13.5	—	—
	males *	27	13.7	—	—
	females *	27	13.2	—	—
	Juveniles	6	15.2	—	—
1951	Spring adults	158	13.3	—	—
	Juveniles	15	18.3	—	—
1952	Spring adults	109	13.6	—	—
	males *	36	13.8	—	—
	females *	60	13.4	—	—
	Juveniles	12	17.1	—	—
1953	Spring adults	103	13.6	—	—
	males *	41	13.9	—	—
	females *	56	13.4	—	—
	Juveniles	9	15.3	—	—
1948/53	Total spring adults	828	13.7	1.07	10.6-19.3
	juveniles	78	16.3	—	12.1-23.4

* Males and females included in the adults figure.

3. *Sedge Warblers.*

A difference of about 0.6 gm. between the average weights of the two sexes is suggested by the frequency distribution. Table VIII shows clearly that as with Willow Warblers heavier birds tend to arrive first, the only exception being 1950. The frequency distribution also shows an irregularity at the heavier end (Fig. 2) which merits further investigation. There is a suggestion of a lack of homogeneity such as would arise from the inclusion of birds of different populations or subspecies. Since the Sedge Warbler is a monotypic species, however, this effect must be attributed to chance unless further evidence is forthcoming.

TABLE VIII—WEIGHTS (IN GM.) OF SEDGE WARBLERS (*Acrocephalus schoenobaenus*), SKOKHOLM, 1948-53

	No.	*Av. wt.*	*Stnd. devn.*	*Wt. range*
1948 Spring adults period 1†	12	11.2	—	—
period 2	12	11.1	—	—
Juveniles	8	12.1	—	—
1949 Spring adults period 1	22	11.6	—	—
period 2	24	11.3	—	—
1950 Spring adults period 1	14	10.7	—	—
period 2	15	11.1	—	—
Juveniles	2	13.8	—	—
1951 Spring adults period 1	26	11.5	—	—
period 2	27	10.5	—	—
1952 Spring adults period 1	12	11.5	—	—
period 2	20	11.0	—	—
1953 Spring adults period 1	13	11.8	—	—
period 2	33	11.0	—	—
Juveniles	1	10.0	—	—
1948/53 Total spring adults * ...	230	11.2	.93	8.1-14.0
juveniles	11	11.3	—	10.0-16.9

† As time of arrival was variable, a different date was selected for each year to represent an approximate mid-point.

* Two adults were captured on autumn migration; these weighed 14.7 and 17.9 gm.

4. *Chiffchaffs*

A difference of 0.5 gm. between the sexes is suggested, with earlier arrival of heavier birds, as can be seen from Table IX.

TABLE IX—WEIGHTS (IN GM.) OF CHIFFCHAFFS (*Phylloscopus collybita*), SKOKHOLM, 1948-53

	No.	*Av. wt.*	*Stnd. devn.*	*Wt. range*
1948 Spring adults before 15th April	11	7.6	—	—
after 15th April ...	15	7.2	—	—
Total spring adults	26	7.4	—	—
1949 Spring adults before 15th April	—	—	—	—
after 15th April ...	3	7.8	—	—

		No.	*Av. wt.*	*Stnd. devn.*	*Wt. range*
1950	Spring adults before 15th April	5	7.5	—	—
	after 15th April ...	10	7.4	—	—
	Total spring adults	15	7.4	—	—
1951	Spring adults before 15th April	7	8.1	—	—
	after 15th April ...	9	7.3	—	—
	Total spring adults	16	7.7	—	—
1952	Spring adults before 15th April	19	7.8	—	—
	after 15th April ...	8	7.2	—	—
	Total spring adults	27	7.6	—	—
1953	Spring adults before 15th April	4	8.3	—	—
	after 15th April ...	10	7.0	—	—
	Total spring adults	14	7.4	—	—
1948/53	Total spring adults	101	7.5	.69	5.7-9.2
1948/53	Total autumn adults and juveniles *	92	8.0	—	6.2-9.5

* It was not always possible to distinguish these. The total in Table I is for birds identified as juveniles.

5. *Spotted Flycatchers.*

A difference of 1 gm. between the sexes is probable, but numbers are too small for this to be asserted with any degree of certainty.

TABLE X—WEIGHTS (IN GM.) OF SPOTTED FLYCATCHERS (*Muscicapa striata*) SKOKHOLM, 1948-53

		No.	*Av. wt.*	*Stnd. devn.*	*Wt. range*
1948/53	Spring adults	67	14.6	—	12.2-17.0
	Autumn adults	9	14.8	—	12.2-16.6
	Total adults	76	14.6	1.1	12.2-17.0
	Juveniles	48	14.5	—	12.8-17.8

6. *Rock Pipits.*

The distribution of juvenile Rock Pipits is definitely bi-modal (Fig. 2) and this characteristic appears to be present in most of the individual yearly totals despite the smallness of numbers involved, suggesting that it is genuine. The difference between the modes is about 1-1½ gm. and may be due to a sex-difference. This, however, cannot be advanced with as much confidence as in the case of spring adults of the species listed above since the position is complicated by factors such as brood-timing and seasonal fluctuations.

7. *Meadow Pipits.*

The frequency distributions of both adults and juveniles are flattened at the mode in a manner which would be consistent with a difference in average weight of the sexes. In the case of adults the position is complicated by the fact that while male weights are probably falling during April, the month to which most of the figures relate, female weights may be showing a temporary rise.

TABLE XI—WEIGHTS (IN GM.) OF MEADOW PIPITS (*Anthus pratensis*), SKOKHOLM, 1948-53

	No.	*Av. wt.*	*Stnd. devn.*	*Wt. range*
1948/53 Total spring adults	97	18.85	1.25	15.2-21.8
Total summer/autumn adults ...	28	18.45	1.05	16.6-21.1
Juveniles	675	18.4	—	13.9-23.4

SUMMARY

During 1947-53 over 4,000 birds of 69 species were weighed on Skokholm. Average weights for each species are given. The reasons for the great variability found to exist in individual birds and within species are discussed. Eight species, namely Meadow Pipit, Rock Pipit, Spotted Flycatcher, Chiffchaff, Willow Warbler, Sedge Warbler, Whitethroat and Wheatear, were weighed in sufficient numbers to permit further analysis. Frequency distributions show twin peaks in most cases; these are attributed to sex differences.

It is shown that spring-migrants passing through Skokholm weigh less than birds on autumn passage. Among residents a peak weight is reached at the end of the nestling stage, followed by a sharp fall on leaving the nest and then a steady rise continuing into late autumn, interrupted by a further fall at the time of the moult.

A study of diurnal variations in the weight of residents during the summer months shows a steady increase to a peak in the afternoon, followed by a slight fall in the early evening.

Weights of birds captured more than once on Skokholm during the spring passage suggest that migrants normally feed little while on the island and depart again within 24 hours. Birds remaining overnight tended to be considerably underweight, but the delay appears to have been impelled by fatigue rather than hunger and most departed within 48 hours showing little increase in weight. A few stayed for several days. These were even more underweight on arrival but fed sufficiently during their stay to be restored almost to normal.

Further details are given for individual species.

ACKNOWLEDGEMENTS

We should like to record our gratitude to Mr. Peter Conder who, besides providing the data on which this study is based, has given us invaluable assistance and encouragement throughout; also to Mr. John Barrett for some initial help, and to Mr. Alec Butterfield for most useful criticism which resulted in a number of alterations in the final draft.

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APPENDIX—SCIENTIFIC NAMES OF SPECIES MENTIONED IN THE TEXT

Storm Petrel (*Hydrobates pelagicus*)
Sparrowhawk (*Accipiter nisus*)
Quail (*Coturnix coturnix*)
Corncrake (*Crex crex*)
Oystercatcher (*Haematopus ostralegus*)
Snipe (*Capella gallinago*)
Common Sandpiper (*Tringa hypoleucos*)
Dunlin (*Calidris alpina*)
Sanderling (*Crocethia alba*)
Lesser Black-backed Gull (*Larus fuscus*)
Puffin (*Fratercula arctica*)
Turtle Dove (*Streptopelia turtur*)
Cuckoo (*Cuculus canorus*)
Little Owl (*Athene noctua*)
Nightjar (*Caprimulgus europaeus*)
Kingfisher (*Alcedo atthis*)
Wryneck (*Jynx torquilla*)
Short-toed Lark (*Calandrella brachydactyla*)
Skylark (*Alauda arvensis*)
Swallow (*Hirundo rustica*)
Jackdaw (*Corvus monedula*)
Blue Tit (*Parus caeruleus*)
Wren (*Troglodytes troglodytes*)
Song Thrush (*Turdus philomelos*)
Redwing (*Turdus musicus*)
Blackbird (*Turdus merula*)
Wheatear (*Oenanthe oenanthe*)
Greenland Wheatear (*Oenanthe oe. leucorrhoa*)
Stonechat (*Saxicola torquata*)
Whinchat (*Saxicola rubetra*)
Redstart (*Phoenicurus phoenicurus*)
Black Redstart (*Phoenicurus ochruros*)
Nightingale (*Luscinia megarhynchos*)
Robin (*Erithacus rubecula*)
Grasshopper Warbler (*Locustella naevia*)
Reed Warbler (*Acrocephalus scirpaceus*)
Sedge Warbler (*Acrocephalus schoenobaenus*)
Aquatic Warbler (*Acrocephalus paludicola*)
Olivaceous Warbler (*Hippolais pallida*)
Blackcap (*Sylvia atricapilla*)
Garden Warbler (*Sylvia borin*)
Whitethroat (*Sylvia communis*)
Lesser Whitethroat (*Sylvia curruca*)
Subalpine Warbler (*Sylvia cantillans*)
Willow Warbler (*Phylloscopus trochilus*)
Chiffchaff (*Phylloscopus collybita*)
Wood Warbler (*Phylloscopus sibilatrix*)
Goldcrest (*Regulus regulus*)
Spotted Flycatcher (*Muscicapa striata*)
Pied Flycatcher (*Muscicapa hypoleuca*)
Dunnock (*Prunella modularis*)
Meadow Pipit (*Anthus pratensis*)
Tree Pipit (*Anthus trivialis*)
Rock Pipit (*Anthus spinoletta*)
Pied Wagtail (*Motacilla alba*)
Grey Wagtail (*Motacilla cinerea*)
Yellow Wagtail (*Motacilla flava*)
Woodchat Shrike (*Lanius senator*)
Red-backed Shrike (*Lanius collurio*)
Starling (*Sturnus vulgaris*)
Greenfinch (*Chloris chloris*)
Goldfinch (*Carduelis carduelis*)
Linnet (*Carduelis cannabina*)
Lesser Redpoll (*Carduelis flammea*)
Chaffinch (*Fringilla coelebs*)
Yellowhammer (*Emberiza citrinella*)
Rustic Bunting (*Emberiza rustica*)
Reed Bunting (*Emberiza schoeniclus*)
Tree Sparrow (*Passer montanus*)

THE BLACK-TAILED GODWIT IN GREAT BRITAIN AND IRELAND, 1938-1952

By Averil Morley and K. L. H. Price

The Black-tailed Godwit (*Limosa limosa*) became a somewhat rare and uncertain visitor to the British Isles after the middle of the 19th century. From the second decade of the present century, however, it became noticeably more frequent in numbers and appearances. One of us, at the suggestion of Dr. N. F. Ticehurst, attempted to examine this increase as recorded in local natural history journals, etc., from 1890 to 1937 (Morley, 1939).

Since then, the increase of the species has been maintained so strikingly in some areas that the Editors of *British Birds* suggested that a second survey of the situation might be made, and this we have tried to do, taking the fifteen years from 1938 to 1952. The impression that the species has continued to increase was confirmed. In the fifteen years 1923-1937 the total number of birds recorded was 1,957; in the fifteen years 1938-1952 the total number was 41,178, or roughly twenty-one times as great. In the previous study, a flock of 150 birds in Sussex in 1938 was the peak flock figure known; such a figure is dwarfed by, for instance, the flock of 1,000 birds inland in Offaly in March 1950 and the flock of 1,500 seen on 19th October 1952 in Hampshire (Shackleton, 1955).

The great increase recorded would probably have been higher still if it had not been for the Second World War of 1939-1945, when opportunities for watching waders on the coast were severely restricted, and many bird-watchers were on active service or engaged in civil defence. Some ornithologists believe that the apparent post-war increase is also due in some part to the increase in bird-watching in the past decade, as compared with the years before 1939.

Some of the increase may have taken place earlier than the records show, as there is evidence in the natural history reports that ornithologists have been unaware of certain coastal resorts of the species, and then, when a chance visit has disclosed its presence there in the form of a good-sized flock, the area has thereafter been visited by observers and a watch kept for its annual reappearance.

METHODS

Methods have been similar to those in the previous study. Journals, a list of which is appended to the end of this paper, have been the main source of information, and unpublished records were asked for only to fill, if possible, certain gaps, e.g. on the east coast of England, the south Welsh coast, and the north-west English coast.

The great increase in the numbers seen has made it a good deal more difficult to decide which records refer to the same flock.

The former arbitrary rule was followed, that birds recorded in the same place within a week were only included once in our totals, unless there was evidence, such as that of plumage, that different individuals were involved. It was difficult to deal satisfactorily with wintering flocks such as those of Hants and Dorset and no hard and fast rule could be followed. We made a close study of the recorded winter pattern for each area, and selected figures accordingly from the mass of records.

It has already been noted that the present period, 1938-1952, included the six years of the Second World War. We have attempted to smooth out the anomaly of these years by calculating the numbers of birds per record for each year, and for the monthly totals of birds (see Tables I and II). Thus, if in a war year 20 birds were seen in 2 records, and in a post-war year 100 birds seen in 5 records, the adjusted figure would be 10 and 20 birds per record respectively, and the increase would appear less steep than if the plain figures were considered. This system also helps to equate the total from an area where observers are sparse, with one well populated by observers, and it enables comparisons to be made between areas of different size. Obviously, the system has its drawbacks. A better system would probably be to work out the number of birds seen per hour of watching, which would account for negative records, but this of course is impossible with our existing data. Greater reliance can be placed on those figures based on a good number of records than on those based on a few records. Such a system would only work with a gregarious species—it would be meaningless in the case of a species such as the Peregrine (*Falco peregrinus*) which would consistently show one or two birds per record. Several observers have remarked how closely gregarious the Black-tailed Godwit tends to be, all the birds present on an estuary tending to coalesce into one large flock rather than to separate into many little parties.

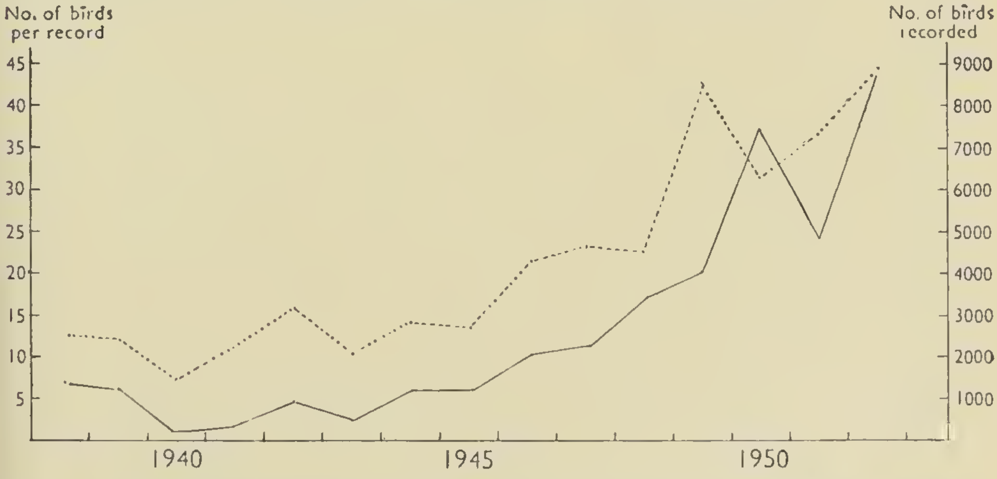


FIG. 1—TO SHOW THE INCREASE OF THE BLACK-TAILED GODWIT (*Limosa limosa*) IN THE BRITISH ISLES BETWEEN 1938 AND 1952

The rise in the annual totals recorded is indicated by the continuous line and in the numbers of birds per record by the dotted one.

The country was divided into the following areas, forming geographical units:

1. *South Coast :* South Cornwall, South Devon, Dorset, Hampshire and the Isle of Wight, Sussex.
2. *Thames Estuary :* Kent, Essex.
3. *Severn Estuary :* North Cornwall, North Devon, Somerset, Gloucestershire, Monmouthshire, Glamorgan, Carmarthen, Pembrokeshire.
4. *Wales, Irish Sea Coast :* Cardigan, Caernavon, Anglesey, Denbigh.
5. *Central England :* Wiltshire, Berkshire, Oxfordshire, Buckinghamshire, Middlesex, Hertfordshire, Surrey, Bedfordshire, Huntingdon, Northamptonshire, Warwickshire, Worcestershire, Herefordshire, Shropshire, Staffordshire, Leicestershire and Rutland, Derbyshire, Nottinghamshire.
6. *Eastern England :* Suffolk, Norfolk, Cambridgeshire, Lincolnshire.
7. *North-east England :* Yorkshire, Durham, Northumberland.
8. *North-west England :* Cheshire, Lancashire, Cumberland.
9. *South-west Scotland :* Ayrshire, Renfrewshire, Lanarkshire, Dunbartonshire, Argyllshire.
10. *Eastern Scotland :* Berwickshire, East Lothian, Midlothian, Fife, Perthshire.
11. *North Scotland :* Inverness-shire, Ross-shire, Caithness and Shetland.
12. *Ireland, East Coast :* Wexford, Dublin, Armagh, Down.
13. *Ireland, West Coast :* Kerry, Cork, Limerick, Clare, W. Tipperary, W. Offaly, Galway, Mayo.

We found no accurate records in the period for counties not named in this list.

DISCUSSION

It will be seen from Table I that in Great Britain the South Coast of England (as in the previous study) carries the heaviest population of Black-tailed Godwits, with a total of 22,892 birds in the 15-year period, i.e. nearly 56% of the total for the British Isles, and with the high figure of 42.4 birds per record. The birds-per-record figures for East and West Ireland are higher still, 119.4 and 56.4 respectively, but the Irish data are drawn mainly from *The Birds of Ireland* (Kennedy, Ruttledge and Scroope, 1954), where, naturally, the numbers of large flocks are given in greater detail than small parties, and this forces up the birds-per-record figure. The South Coast is followed by a second group, Eastern England, Eastern Scotland and North-west England, with 23.7, 21.7 and 20.2 birds per record respectively—roughly half the density on the South Coast. It should, however, be noted that in the case of Eastern England there is a great difference between Suffolk and its sister county of Norfolk. During the 15-year period the average number of birds seen per record in Suffolk was 40.5, while in Norfolk it was 4.3. In fact, Suffolk's average almost equals that for the South Coast. In North-west England, Lancashire provides 90% of the birds.

There follows a third group comprising Severn Estuary, 14.1, and Thames Estuary, 11.3. In the Severn Estuary group, Carmarthen, with a total of 1,336 birds, is the stronghold of the species in this area, again a repetition of the pattern of distribution shown in the previous study. Lastly comes the lowest and fourth group, all under 5 birds per record, Wales Irish Sea Coast, South-west Scotland, North-east England, Central England, North Scotland.

In some places the Black-tailed Godwit now outnumbers the Bar-tailed Godwit (*Limosa lapponica*), e.g. in Chichester Harbour (Sussex) in 1949, in the Blythburgh district (Suffolk) for 1950 and 1951, and in Cork Harbour each winter. The 1944 *Report on Dorset Birds* notes that the species has increased enormously of late years in Dorset. Some estuaries of the South Coast, such as those in Dorset and Hampshire, hold wintering flocks. In 1946-47 the number wintering in Poole Harbour was stated to be *ca.* 300, and in 1953 it is noted that "in recent years" 500-600 birds were wintering there (Bull, 1953). In Chichester Harbour, Sussex, the numbers apparently wintering in the years 1948-51 varied from 30 to 200. The records would also imply that a flock of *ca.* 300 wintered on the Orwell estuary (Suffolk) in 1951-52. The Misses Baxter and Rintoul (1953) state that there is a greater tendency to winter in the Lothians, Fife and Angus, and mention a particular increase in numbers in this area. Kennedy *et al.* (1954) note that in Ireland many remain throughout the winter in favoured localities, increasingly so in the Shannon Estuary, which appears to be, like the South Coast of England, a principal resort of the species in these islands. It is also interesting that the species is found in large flocks, up to 1,000 strong, as far up the Shannon Valley as Banagher.

Meanwhile, in quiet and unspectacular fashion, individuals from the main wave of increase appear where formerly the species was unknown or rare. The Isle of Wight had its first record in 1938, Wiltshire in 1944. In Leicestershire, another inland county, where there had been 4 records in the 56 years from 1887 to 1943, there were 7 records during the 9 years from 1944 to 1952. The first spring record for this county was in March 1945. The first spring record for Fair Isle was in 1943. In 1938, the *South-eastern Bird Report* noted that in east Kent the species was formerly seldom seen in spring but now turns up regularly. On 19th August 1951, 68 birds, "the largest number so far recorded on Somerset coast" were seen. It will be interesting to see if this figure is surpassed in this county in future years. In the previous study, Somerset's peak figure was 23 at an inland reservoir in 1934. In the 1945 report for Northumberland and Durham it is noted that Abel Chapman in his book *The Borders and Beyond* (1924) stated that he had only once met with the species on the north-east coast. For Northumberland alone, in the period under review, the total number of birds recorded was 110. At the end of the last century the species was considered to be very rare in Mayo, but now it occurs annually on passage, chiefly in April and May (Kennedy *et al.*, 1954).

The Black-tailed Godwit population of the British Isles is primarily a non-breeding population, though successful nesting has been recorded—see, for example, Pilkington (1947), Venables

TABLE I—BLACK-TAILED GODWIT (*Limosa limosa*): NUMBER OF BIRDS PER RECORD, 1938-1952

Area	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	Total
South Coast																
No. of birds	745	776	92	226	599	219	681	647	663	1,789	2,561	2,762	2,919	2,144	6,069	22,892
No. of records ...	51	59	15	13	15	12	22	26	31	34	71	45	54	37	60	545
No. of birds per record	14.6	13.2	6.1	17.4	39.9	18.3	31	24.9	21.5	52.6	36.1	61.4	54.1	57.9	101.1	42.4
Thames Estuary																
No. of birds	90	103	—	—	9	5	4	7	66	93	15	2	329	174	50	947
No. of records ...	18	6	—	—	2	3	1	2	4	9	7	2	10	9	11	84
No. of birds per record	5	17.2	—	—	4.5	1.7	4	3.5	16.5	10.3	2.1	1	32.9	19.3	4.6	11.3
Severn Estuary																
No. of birds	245	331	147	44	192	39	289	151	100	66	59	108	854	319	316	3,260
No. of records ...	23	15	10	4	14	13	24	12	14	10	10	12	30	14	26	231
No. of birds per record	10.7	22.1	14.7	11	13.7	3	12	12.6	7.1	6.6	5.9	9	28.5	22.8	12.2	14.1
Wales Irish Sea																
No. of birds	—	1	—	—	3	2	—	—	—	—	—	—	—	—	31	37
No. of records ...	—	1	—	—	2	2	—	—	—	—	—	—	—	—	4	9
No. of birds per record	—	1	—	—	1.5	1	—	—	—	—	—	—	—	—	7.8	4.1
England Central																
No. of birds	31	12	4	16	25	16	36	65	28	50	47	27	59	8	64	488
No. of records ...	12	7	4	6	11	7	14	18	16	26	18	7	23	8	24	201
No. of birds per record	2.6	1.7	1	2.7	2.3	2.3	2.6	3.6	1.8	1.9	2.6	3.9	2.6	1	2.7	2.4
England Eastern																
No. of birds	11	25	20	28	8	2	45	23	35	161	78	185	1,899	1,847	1,385	5,752
No. of records ...	5	8	4	4	3	2	12	8	9	7	19	14	79	47	22	243
No. of birds per record	2.2	3.1	5	7	2.7	1	3.8	2.9	3.9	23	4.1	13.2	24	39.3	63	23.7
England North-east																
No. of birds	2	30	1	5	5	1	30	21	10	84	37	12	38	12	27	315
No. of records ...	2	3	1	2	3	1	10	7	8	8	6	3	16	7	16	93
No. of birds per record	1	10	1	2.5	1.7	1	3	3	1.3	10.5	6.2	4	2.4	1.7	1.7	3.4

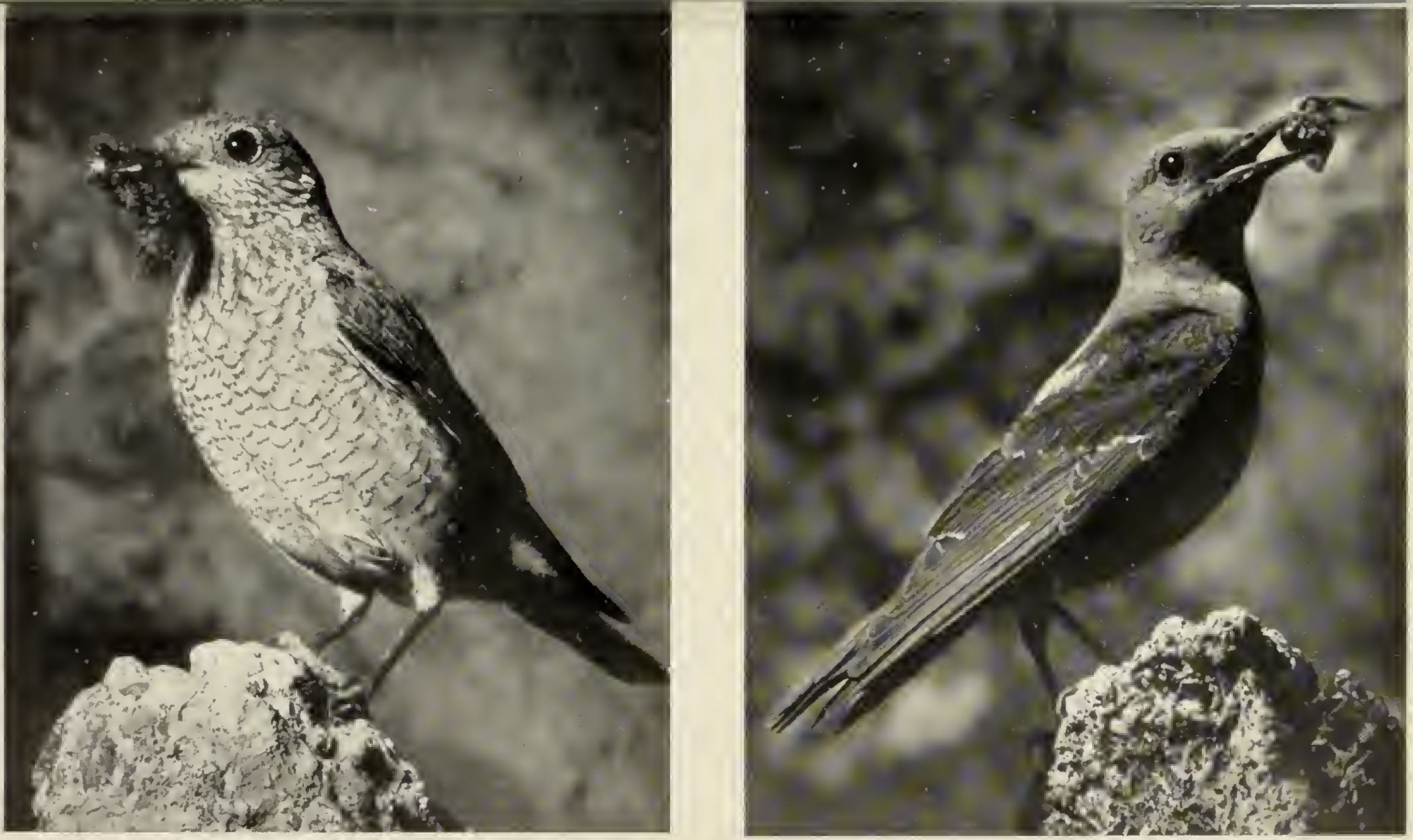
TABLE I—BLACK-TAILED GODWIT (*Limosa limosa*): NUMBER OF BIRDS PER RECORD, 1938-1952—(*continued*).

	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	Total
England North-west...																
No. of birds	—	8	2	21	17	59	2	65	67	55	502	403	235	288	483	2,207
No. of records ...	—	5	1	4	3	4	1	10	6	5	14	14	14	6	22	109
No. of birds per record	—	1.6	2	5.3	5.7	14.8	2	6.5	11.2	11	35.9	28.8	16.8	48	22	20.2
Scotland South-west																
No. of birds	2	—	12	—	9	18	—	—	—	—	—	3	—	—	—	44
No. of records ...	1	—	1	—	5	3	—	—	—	—	—	2	—	—	—	12
No. of birds per record	2	—	12	—	1.8	6	—	—	—	—	—	1.5	—	—	—	3.6
Scotland East																
No. of birds	30	—	—	—	—	—	—	—	—	—	—	262	44	92	160	588
No. of records ...	1	—	—	—	—	—	—	—	—	—	—	7	7	5	7	27
No. of birds per record	30	—	—	—	—	—	—	—	—	—	—	37.4	6.3	18.4	22.9	21.7
Scotland North and Shetland																
No. of birds	—	—	—	—	—	3	—	1	4	—	3	5	5	—	1	22
No. of records ...	—	—	—	—	—	1	—	1	1	—	2	2	2	—	1	10
No. of birds per record	—	—	—	—	—	3	—	1	4	—	1.5	2.5	2.5	—	1	2.2
Ireland West Coast																
No. of birds	298	—	—	—	121	199	125	227	500	—	57	951	1,000	6	200	3,684
No. of records ...	2	—	—	—	4	7	3	4	1	—	3	5	1	1	1	32
No. of birds per record	149	—	—	—	30.2	28.4	41.7	56.8	500	—	19	190.2	1,000	6	200	115.1
Ireland East Coast ...																
No. of birds	—	—	—	40	—	25	36	—	598	—	105	125	—	—	13	942
No. of records ...	—	—	—	1	—	1	2	—	6	—	3	2	—	—	2	17
No. of birds per record	—	—	—	40	—	25	18	—	98	—	35	62.5	—	—	6.5	55.4
TOTAL																
No. of birds	1,454	1,286	278	380	988	588	1,248	1,207	2,071	2,298	3,464	4,845	7,382	4,890	8,799	41,178
No. of records ...	115	104	36	34	62	56	89	88	96	99	153	115	236	134	196	1,613
No. of birds per record	12.6	12.4	7.7	11.2	15.9	10.5	140	13.7	21.6	23.2	22.6	42.1	31.6	36.5	44.4	25.4

TABLE II—BLACK-TAILED GODWIT (*Limosa limosa*): MONTHLY NUMBERS OF BIRDS PER RECORD, 1938-1952

Area	January	February	March	April	May	June	July	August	September	October	November	December	Total	No date	Grand Total
South Coast															
No. of birds	2,316	1,627	1,101	1,624	423	220	723	3,196	3,550	3,212	1,250	3,602	22,844	48	22,892
No. of records ...	32	21	48	53	33	24	45	83	87	46	24	46	542		
No. of birds per record	72.4	77.5	23	30.6	12.8	9.2	16.1	38.5	40.8	69.8	52.1	82.7	42.1		
Thames Estuary															
No. of birds	30	—	16	21	42	12	36	300	111	306	42	31	947	—	947
No. of records ...	2	—	3	7	10	5	8	24	12	4	5	4	84		
No. of birds per record	15	—	5.3	3	4.2	2.4	4.5	2.5	9.3	76.5	8	7.8	13.3		
Severn Estuary															
No. of birds	229	103	140	74	48	11	72	622	985	485	277	181	3,227	33	3,260
No. of records ...	11	13	18	19	8	5	10	55	48	20	12	8	227		
No. of birds per record	20.8	7.9	7.8	3.9	6	2.2	7.2	11.3	20.5	24.3	23.1	22.6	13.1		
Wales Irish Sea Coast															
No. of birds	—	—	—	—	—	—	1	20	16	—	—	—	37	—	37
No. of records ...	—	—	—	—	—	—	1	6	2	—	—	—	9		
No. of birds per record	—	—	—	—	—	—	1	3.3	8	—	—	—	4.1		
Central England ...															
No. of birds	—	—	25	99	66	4	42	154	87	8	—	—	485	3	488
No. of records ...	—	—	13	41	29	1	20	54	37	5	—	—	200		
No. of birds per record	—	—	1.9	2.4	2.3	4	2.1	2.9	2.4	1.6	—	—	2.5		
Eastern England															
No. of birds	568	460	330	635	141	92	601	594	483	1,184	6	630	5,724	28	5,752
No. of records ...	8	7	16	32	37	15	30	43	25	20	3	7	243		
No. of birds per record	71	65.7	20.6	19.8	3.8	6.1	20	13.8	19.3	59.2	2	90	26.7		
North-east England															
No. of birds	3	10	3	167	29	4	14	27	47	5	4	2	315	—	315
No. of records ...	2	1	3	27	12	4	7	15	14	2	4	2	93		
No. of birds per record	1.5	10	1	6.9	2.4	1	2	1.8	3.4	2.5		1	2.9		

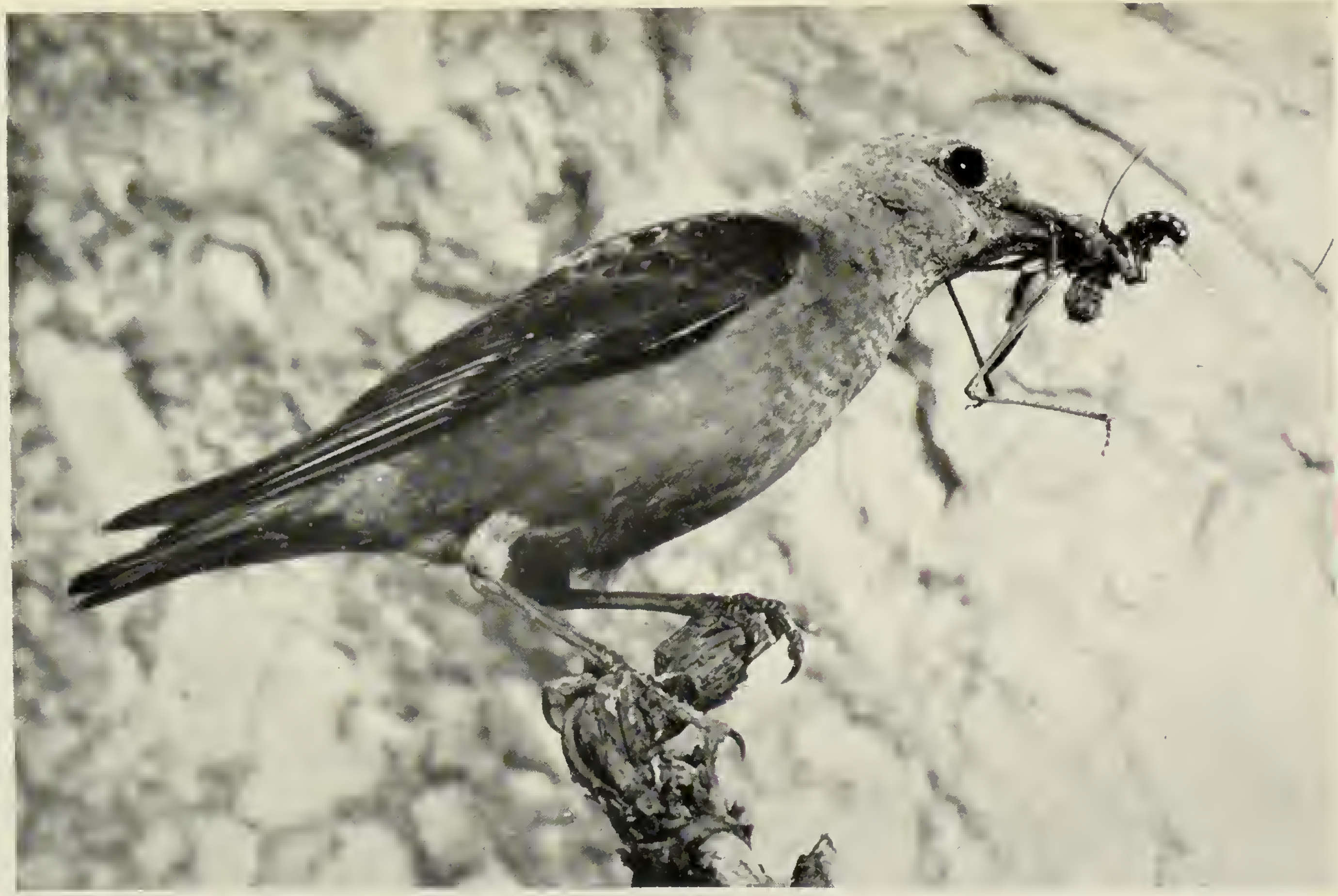
PLATE 29



K. Koffán

ROCK THRUSHES (*Monticola saxatilis*): HUNGARY

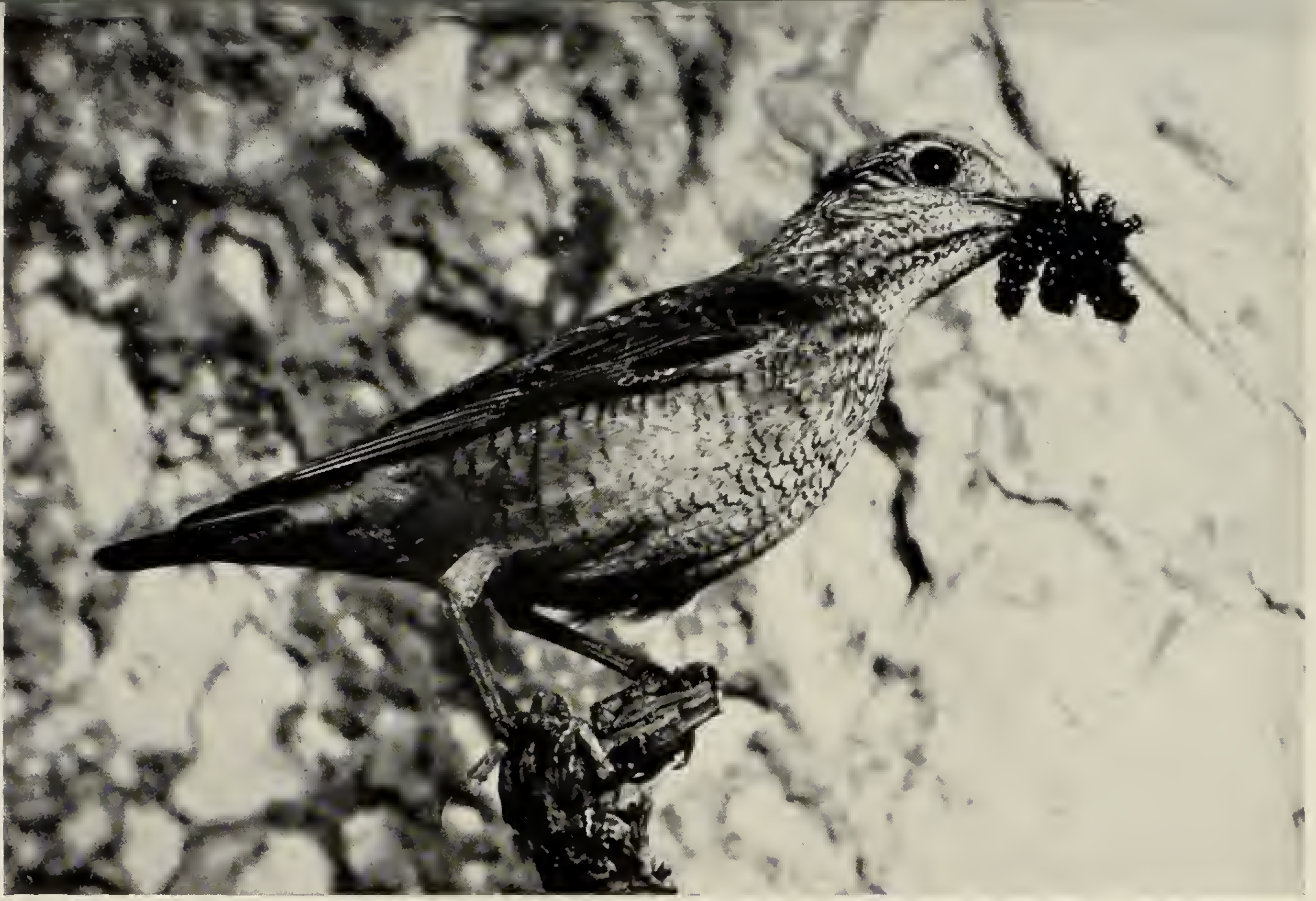
The left-hand photograph shows the female, and the other the male. This series of plates once more illustrates the value of photography as an aid to the identification of the food of birds: the female is carrying an ermine moth caterpillar (*Spilosoma* sp.) while the male has one of the scarabid beetles—*Rhisotrogus aequinoctialis* (see page 270).



K. Koffán

MALE ROCK THRUSH (*Monticola saxatilis*): HUNGARY

A black-and-white photograph can give no idea of the brilliant colouring of the male in summer plumage, with his blue head and mantle, white lower back, orange under-parts and tail, and blackish wings. In winter, brown and buff tips obscure much of this colour and the male becomes superficially like the female, but darker and bluer above and more orange below.



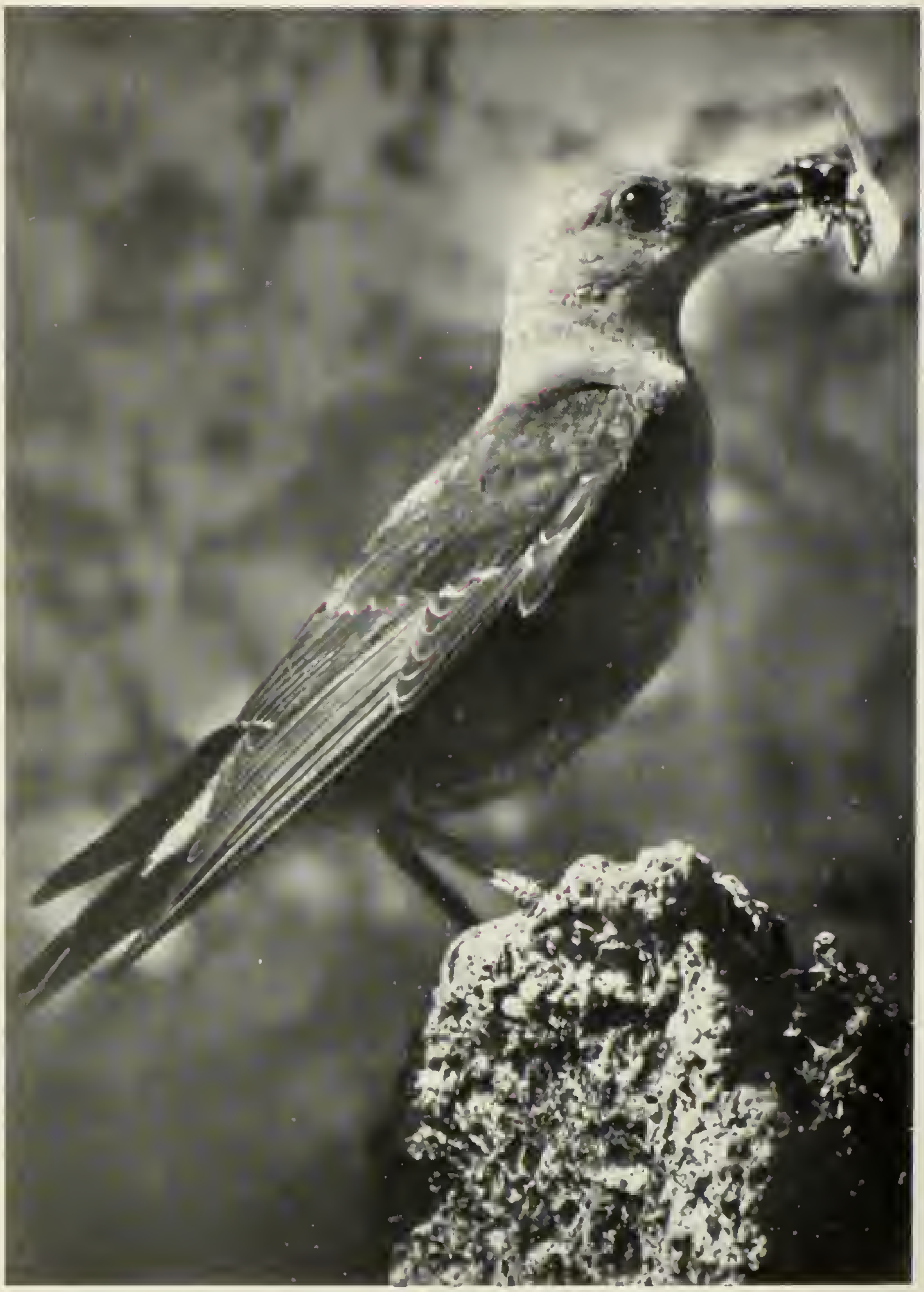
K. Koffán

FEMALE ROCK THRUSH (*Monticola saxatilis*): HUNGARY

The female is predominantly brown above and orange-buff below, but strongly mottled on the upper-parts and strikingly barred underneath with dark brown, crescent-shaped markings which show up well in this and other plates. Like the male, however, she has a bright orange tail which is a good field-character of the species at all ages (see page 268).

PLATE 32

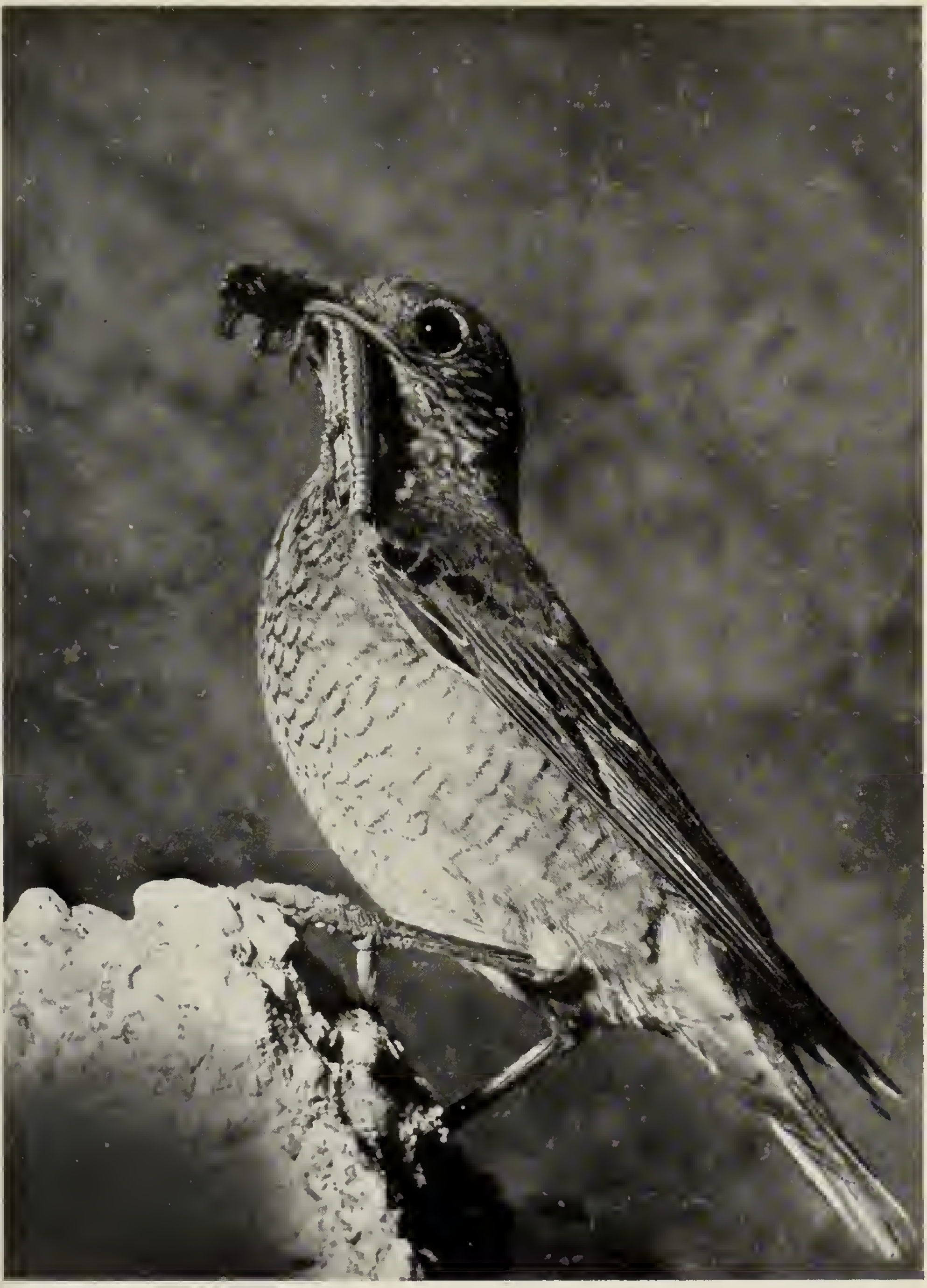
BRITISH MUSEUM NATURAL HISTORY



K. Koffán

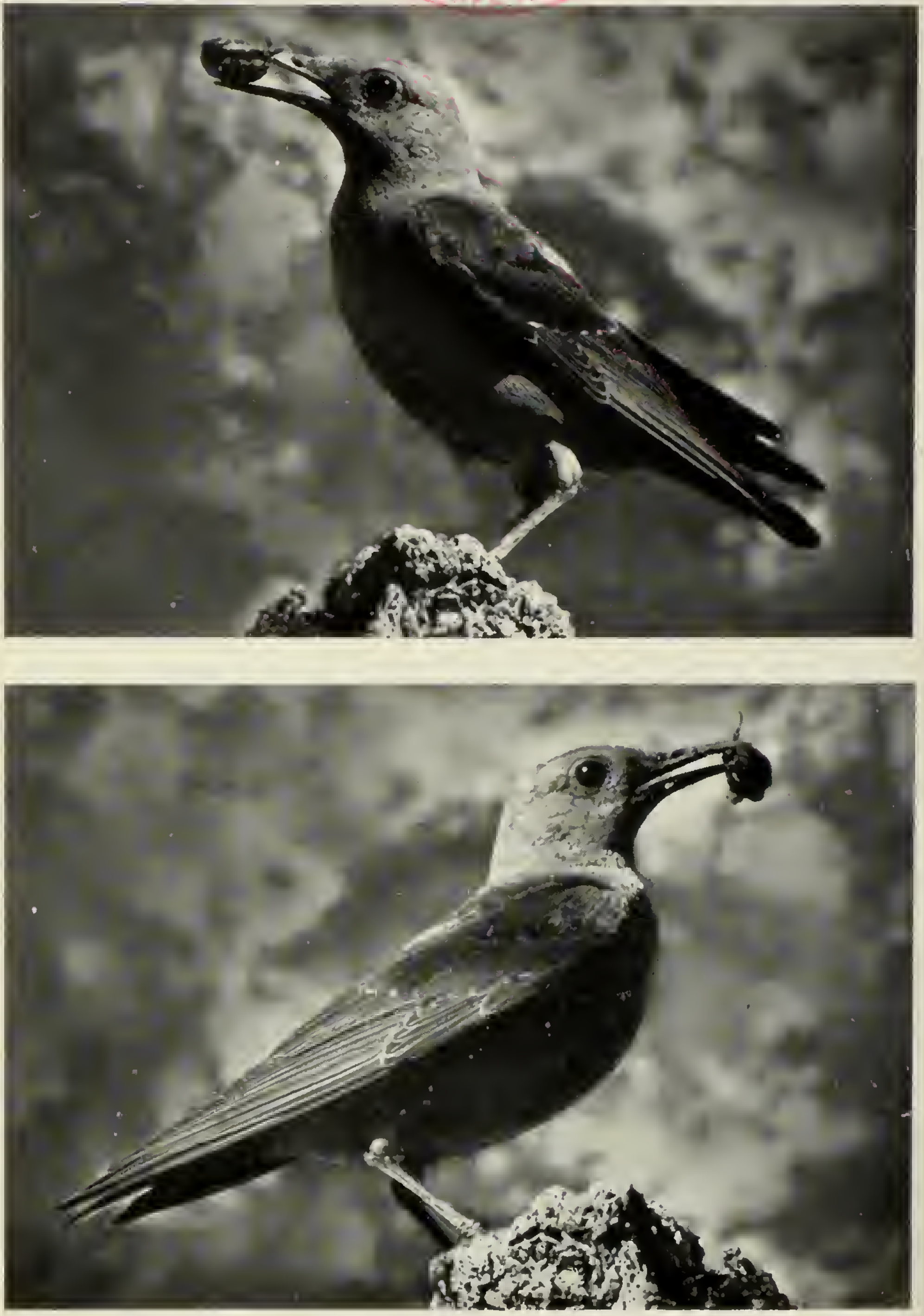
MALE ROCK THRUSH (*Monticola saxatilis*): HUNGARY

This photograph illustrates well the upright stance, rather chat-like, which is a marked character of the species. The Rock Thrush also has a characteristic way of flicking its tail upwards and then swinging it from side to side. The food carried here includes a specimen of *Hyphantria cunea* (see page 270).



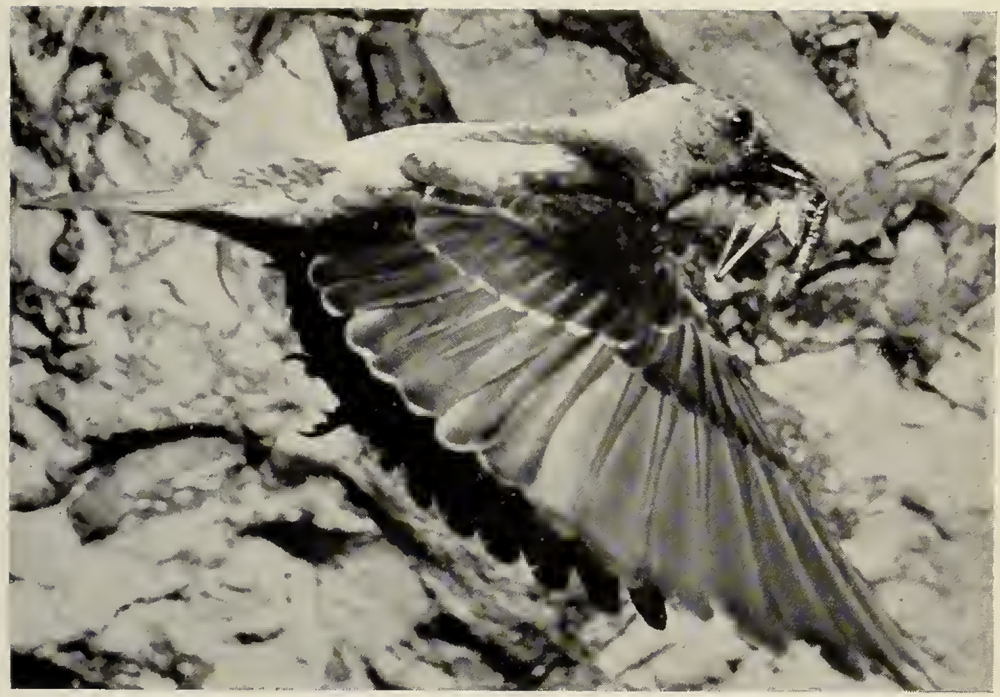
K. Koffán

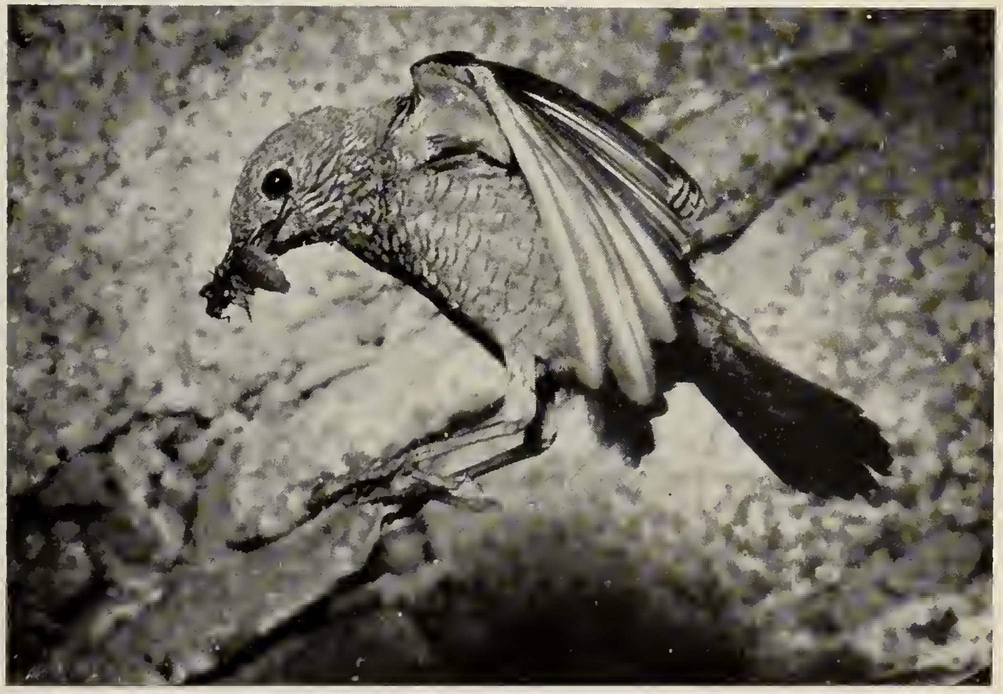
FEMALE ROCK THRUSH (*Monticola saxatilis*): HUNGARY
This again shows the upright stance, and the characteristic markings on the under-parts of the female. The Rock Thrush is normally considered to be primarily insectivorous, but in Hungary, where these photographs were taken, three species of lizards (in this instance, the Wall Lizard, *Lacerta muralis*) were among the foods recorded (see page 271).



K. Koffán

Male Rock Thrush (*Monticola saxatilis*): Hungary
Two views of the same bird: in each the edge of the white patch on the lower back is just visible. Beetles make up a considerable part of the Rock Thrush's food and the prey in the upper photograph has been identified as *Copris lunaris*, and in the lower as one of the species of *Geotrupes* (see page 270).





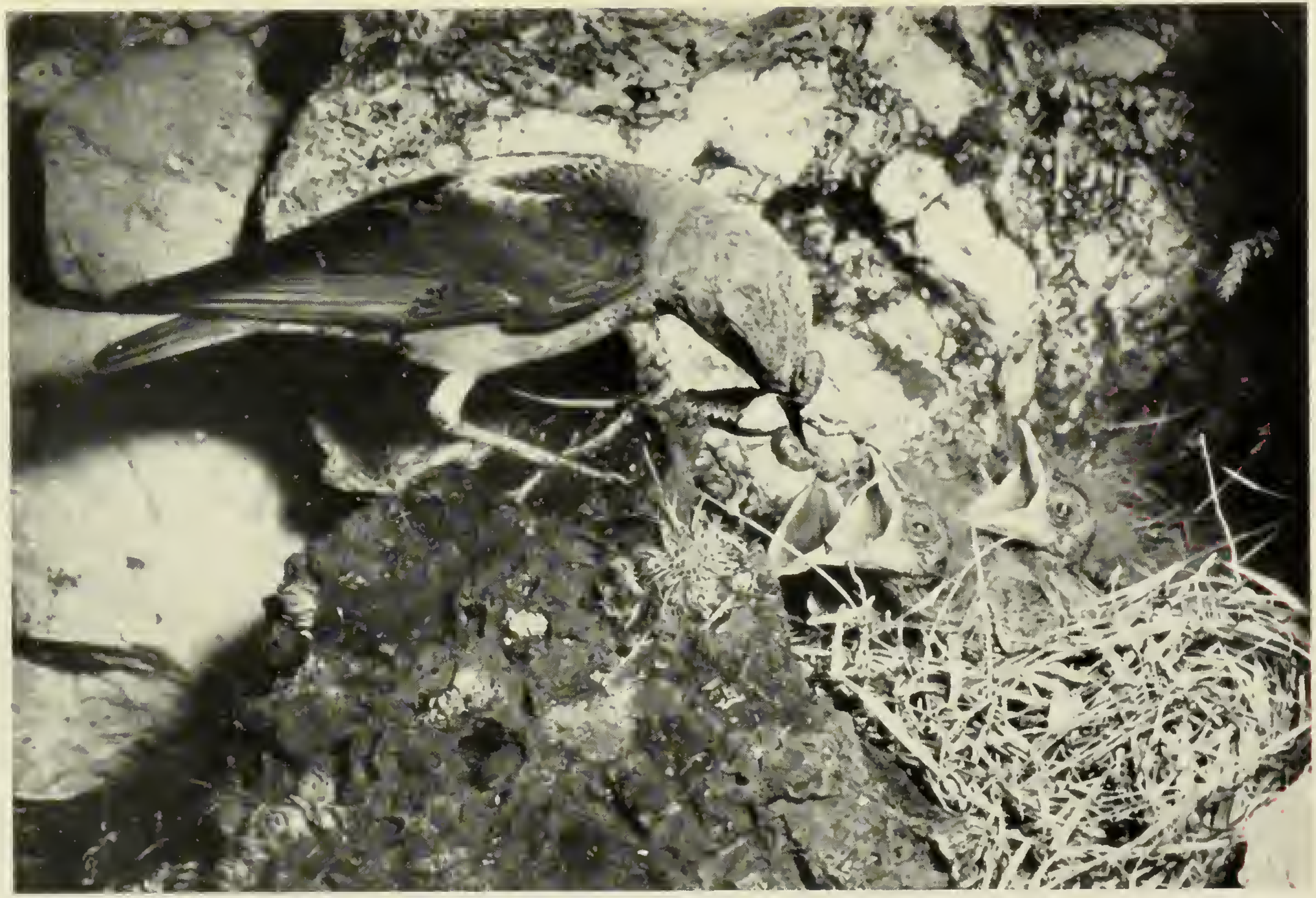
K. Koffán

Rock Thrushes (*Monticola saxatilis*) in flight: Hungary

The upper shows the male, the lower the female. Light here unfortunately exaggerates the size of the white patch on the back of the male, but this plate does serve to show that it is the lower back, rather than the rump, which is white. Except in its display-flights (see page 269) the Rock Thrush is usually rather secretive and flies low, dropping out of sight among the rocks.

Plate 36

NATURAL HIS



K. Koffán

Male Rock Thrush (*Monticola saxatilis*) feeding young: Hungary

This again shows the white on the back. Among the prey carried here is part of another lizard—the Sand Lizard (*Lacerta agilis*). The nest, as this shows, is normally built of grasses and roots and is tucked away in a hole or crevice among rocks or in a wall or ditch. In this part of Hungary two broods are frequently recorded (see page 269).

TABLE II—BLACK-TAILED GODWIT (*Limosa limosa*): MONTHLY NUMBERS OF BIRDS PER RECORD, 1938-1952—(*continued*).

Area	January	February	March	April	May	June	July	August	September	October	November	December	Total	No date	Grand Total
England North-west															
No. of birds	97	192	2	132	50	—	285	139	618	370	146	176	2,207	—	2,207
No. of records ...	8	7	2	14	6	—	13	18	15	10	7	9	109		
No. of birds per record	12.1	27.4	1	9.4	8.3	—	21.9	7.7	41.2	37	20.9	19.6	18.8		
Scotland South-west															
No. of birds	1	—	—	1	3	—	—	35	1	1	2	—	44	—	44
No. of records ...	1	—	—	1	2	—	—	5	1	1	1	—	12		
No. of birds per record	1	—	—	1	1.5	—	—	7	1	1	2	—	2.7		
Scotland East															
No. of birds	53	43	—	6	6	—	50	72	268	25	—	65	588	—	588
No. of records ...	2	2	—	3	3	—	2	7	4	2	—	2	27		
No. of birds per record	26.5	21.5	—	2	2	—	25	10.3	67	12.5	—	32.5	22.1		
Scotland North and Shetland															
No. of birds ...	—	1	—	—	5	5	—	2	—	—	—	1	14	8	22
No. of records ...	—	1	—	—	2	2	—	2	—	—	—	1	8		
No. of birds per record	—	1	—	—	2.5	2.5	—	1	—	—	—	1	1.8		
Ireland West Coast ...															
No. of birds	—	684	1,040	293	32	—	103	804	497	120	91	—	3,664	20	3,684
No. of records ...	—	4	2	3	4	—	2	5	7	2	2	—	31		
No. of birds per record	—	171	520	97.7	8	—	51.5	160.8	71	60	45.5	—	118.2		
Ireland East Coast															
No. of birds	—	75	—	100	48	94	11	112	—	500	2	—	942	—	942
No. of records ...	—	3	—	1	3	4	1	2	—	1	2	—	17		
No. of birds per record	—	25	—	100	16	23.5	11	56	—	500	1	—	53.4		
TOTAL No. of birds...	3,297	3,195	2,657	3,152	893	442	1,938	6,077	6,663	6,216	1,820	4,688	41,038	140	41,178
No. of records ...	66	59	105	201	149	60	139	319	252	113	60	79	1,602		
No. of birds per record	50.0	54.2	25.3	15.7	6.0	7.4	13.9	19.1	26.4	55.0	30.3	59.3	25.6		

and Venables (1955). Therefore it would be commonsense to suppose that a plentiful food supply is one of the chief factors determining the distribution. It would be an interesting piece of research to assess the relative feeding values of different estuarine deposits, and see if there is any relation between godwit population and the invertebrate populations of various geological habitats. We do not yet really know where our godwits are bred, as there have been no recoveries in the British Isles of birds ringed abroad. However, we approached two Dutch ornithologists, Messrs. J. Kist and J. E. Sluiters, for information on the present status and trend of population of the species in Holland, where it breeds so commonly, and so closely to our own islands. Mr. Kist replied that from 1920 to 1950 there has been a continual increase in Holland in the breeding population. There are no data for the last five years, but he believes that this increase has now stopped, and indeed in 1955 there was an evident decrease in several localities, perhaps due to the bad spring weather. Mr. Sluiters stated that the Black-tailed Godwit is generally widespread, and locally sometimes numerous as a breeding bird. It is increasing in some places in the north and north-west of the Netherlands, but decreasing in other places such as North Brabant. But he also says there are no detailed reports over the last six years, and the species being so common, it is difficult to make a good census of its population.

The value of an analysis of published records depends ultimately on the assiduousness and accuracy of local ornithologists, and thus we wish to express our hope that natural history societies should see their way to publishing in full the notes of numbers collected by their members. The spectre of expenses is always at the elbow of the compilers of annual ornithological reports, and it must often be tempting to do some telescoping by such a phrase as "26 seen on July 15, thereafter observed regularly till the end of the year", or "seen in every month except June". But it does seem a pity that when material has been collected some of it should become lost, perhaps for ever, and especially when by its inclusion a more accurate picture could be built up of a decreasing or increasing species.

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Barrow Nat. Field Club, Bedford Nat. Hist. Soc. & Field Club, Birmingham & West Midland Bird Club, Bournemouth Nat. Science Soc., Bristol Nat. Soc., *British Birds,* Cambridge Bird Club, Caradoc & Severn Valley Field Club, Cardiff Nat. Soc., Carlisle Nat. Hist. Soc., Cornwall Bird Watching & Preservation Soc., Devon Bird Watching & Preservation Soc., Derbyshire Arch. & Nat. Hist. Soc., Dorset Nat. Hist. & Arch. Soc., *Edinburgh Bird Bulletin,* Essex Bird Watching & Pres. Soc., Essex Field Club, *Fair Isle Bird Observatory Bulletin,* Gibraltar Point Nature Reserve, *Glasgow and West of Scotland Bird Bulletin,* Great Yarmouth Nat. Soc., Hampshire Field Club, *Hastings & East Sussex Naturalist,* Hereford Orn. Club, Herts Nat. Hist. Soc. & Field Club, Hunts Fauna & Flora Soc., *Irish Nat. Journal,* Isle of Thanet Field Club, Isle of Wight Nat. Hist. & Arch. Soc., Kent Orn. Soc., *Lakeland Ornithology,* Lancs. & Cheshire Fauna Committee, Leicestershire & Rutland Orn. Soc., Lincolnshire Nat. Union, Liverpool Nat. Field Club, London Nat. Hist. Soc., Lowestoft & N. Suffolk Field Nat. Club, Manx Field Club, Merseyside Nat. Association, Middle Thames Nat. Hist. Soc., Nat. Hist. Soc. of Northumberland, Durham & Newcastle upon Tyne, Norfolk Nat. Trust, Northants. Nat. Hist. Soc. & Field Club, *Ornithological Record for Derbyshire, Ornithology of the Isle of Man,* Oundle School Nat. Hist. Soc., Oxford Orn. Soc., *Report on Birds Observed in Herts., Scottish Naturalist,* Société Jersiaise, Somerset Arch. & Nat. Hist. Soc., *South-Eastern Bird Report,* South Essex Nat. Hist. Soc., *Suffolk Bird Report,* Suffolk Nat. Soc., *Sussex Bird Report,* Torquay Nat. Hist. Soc., West Wales Field Soc., Wiltshire Arch. & Nat. Hist. Soc., Yorkshire Nat. Union.

PHOTOGRAPHIC STUDIES OF SOME LESS FAMILIAR BIRDS

LXXI. ROCK THRUSH

Photographed by KAROLY KOFFAN

(Plates 29-36)

THE Rock Thrush (*Monticola saxatilis*) and the Blue Rock Thrush (*M. solitarius*) are both birds of the mountains of southern Europe and Asia, breeding from Spain (also Morocco and, in the case of the Blue Rock, N. Algeria and Tunisia) to China. In parts of its range, particularly Europe, the Blue Rock is mainly a resident, but *saxatilis* is almost everywhere a summer-visitor, wintering chiefly in tropical Africa. In Europe the Rock Thrush extends its range rather further north than the Blue Rock and is found breeding in central France, southern Germany and Hungary and Rumania. It was in Hungary, in fact, that Mr. Koffán for several years studied and photographed this species and we are extremely grateful to him for providing not only a fine selection of the results but also a short account of the birds as he knows them. In addition, his colleague, Dr. Tibor Farkas, has kindly sent us some notes on the food of the species.

Both these contributions appear below and there is therefore little need for us to discuss the features brought out by the photographs. It seems worth remarking, however, that while the male's striking colouring of blue head and mantle, white lower back, orange under-parts and tail, and blackish wings is, of course, entirely lost in black-and-white photography, the distinctive markings of the female, noteably the crescent-barrings on the under-parts, are well brought out in these shots (see plates 29, 31 and 33), as is the characteristic, upright, chat-like stance of the species (plates 29, 32 and 33, in particular). Finally, we have here again examples of the value of photography as an aid to the identification of the food of birds, a method already developed in this country by Eric Hosking and Dr. Stuart Smith (e.g., *antea,* vol. xlii, p. 358). I.J.F.-L.

SOME NOTES ON DISPLAY AND NESTING

FOR many years I have studied Rock Thrushes (*Monticola saxatilis*) in the barren mountains of Budaörs in Hungary. About 5-6 pairs breed here; the nests are constructed in the crevices of old quarries, in the well-hidden recesses of rock-faces, under blocks of stone and on the sides of slopes and ditches. Since the 1939-45 war, however, the thrushes have shown a preference for frequenting the ruins on the fringe of the village. The bird nests in May, but the males arrive some time earlier than the females—for instance, in 1955 the males came on 3rd April whereas the females did not arrive here until the 28th. The males sing vigorously even before the arrival of the females, and they perform really acrobatic feats in mid-air. They hurtle up from their perches, high into the air, and then suddenly drop again; after a steep dive of about 5 or 6 metres, apparently still carried along by their own impetus, they start to rise again—this time, however, not so steeply as in the first upward flight from the perch; the highest point of flight is reached amid ever more rapid wing-beats. This game is repeated 4 or 5 times, until they finally alight once more on their perches.

The display-dance of the Rock Thrush is a very lovely sight. I was once able to observe the dance of a male who, still wet from a dip, was singing to a female, bowing with his wings hanging at his side, waving to and fro his fanned-out tail.

As regards their nests, I have noticed that if the nest is visible from any quarter, the bird always puts the eggs on the opposite side of it, so that they are always out of the line of vision of any intruder.

The number of nests which come to grief is large. Such breeding-pairs as lose their brood make a second or even third attempt; then, as a rule, the new nest is not far removed from the old one. Second broods are also frequent; for instance, the pair I photographed in 1953, whose first brood flew on 10th June, were on 17th July already feeding the fledged young of their second brood.

The behaviour of the parents varies, as does their relationship towards their young. The male of the breeding-pair I mentioned above, for instance, never once did the feeding while I was photographing. On the other hand, another male flew several times running in succession to my camera before settling on the nest. When both parents do the feeding undisturbed, it takes place approximately every 10 minutes. It has also happened that the male has done the feeding directly before or after the female. Animal food is brought alive to the nest; cherries are eaten whole with their stones. Whenever the brood has been fed on cherries, the flooring of the nest is full of the stones. Excrement is always taken away from the nest; I have never known the parent Rock Thrushes to swallow it—a habit common among, for instance, Song Thrushes (*Turdus philomelos*). The nature of the food may be responsible for this. Before feeding the brood, the parents always settle on their customary perch, and only after they have looked around and noticed nothing unusual do they fly to the nest. Now and again a few notes are sung by male and female alike.

These photographs, which are of two pairs, were taken from a distance of 1 metre. The first pair had their nest on a rocky hillside; the female here, judging from her behaviour, would be more properly described as "masculine", since her actions and movements were erect and proud. My work here lasted 2½ days, during which I was repeatedly hindered by unexpected downpours. This pair ate only animal food; if one of them let anything fall out of its beak, he would throw himself down after the dropped prey. The female even carefully picked up again the broken-off tail of a lizard.

In this way I was able to compile valuable records of the birds' food, especially the hairy caterpillars. From my tent I could well observe the beauty of this beautiful bird's way of life, unfortunately better than my camera could catch each detail of it.

KAROLY KOFFAN

FOOD AND FEEDING-HABITS

I have already written (Farkas, 1955) the essentials about the feeding-habits and food of the Rock Thrush (*Monticola saxatilis*) in Hungary. Now I would like to take the opportunity of discussing in more detail such points as in that earlier work I was able only to touch upon. The feeding-material of the Rock Thrush in Hungary comes under the following three categories: (a) Insects, (b) Other animals, (c) Plants—in that order of importance. I would now like to consider briefly these components and the way in which they are taken.

(a) *Insects.*—In this category hairy caterpillars above all are of great importance. That small birds too, eat such caterpillars—a special treat—has recently been more emphasized, for example by Mansfeld (1955) with regard to tits (*Parus* spp.) and Chaffinches (*Fringilla coelebs*). In the first photograph (plate 29, left) the female is carrying an ermine moth caterpillar (*Spilosoma*), so it seems that they not only eat such caterpillars but also feed them to their young! Plate 32 should prove not without interest, since it confirms the fact that the birds eat *Hyphantria cunea,* a dangerous pest. Different species of beetle make up a considerable part of the Rock Thrush's food: *Copris lunaris* (plate 34, left), *Geotrupes* sp. (plate 34, right) and *Rhisotrogus aequinoctialis* (plate 29, right) also testify to the active nature of the bird. Unfortunately Herr Koffán has not yet succeeded in getting photographic proof of the capture of *Cetonia* species, which beetles—by reason of the large numbers in which they appear in the bird's habitat—are an important item. *Cetonia* and *Rhisotrogus* are mostly caught in flight, and the pellets lying around the various perches of the bird shimmer with the remains of these beetle's wings. The bird kills and rends this kind of prey with strong hammering blows of its beak; this was also observed in caged specimens, which mastered the Cockchafers (*Melolontha melolontha*) and Rose Chafers (*Cetonia aurata*) thrown to them, by means of woodpecker-like blows, directed vertically downwards. Somtimes the birds would warily circle a larger beetle and deliver each blow from a different direction.

(b) *Other animals.*—In this category the most important section is undoubtedly the vertebrates. That these birds also sometimes seize upon vertebrate animals was already to be conjectured from the writings of La Touche (1920) and Broekhuysen (1941) among others. La Touche remarked of a Blue Rock Thrush (*Monticola solitarius pandoo*) that this bird had killed a mouse. Broekhuysen gave tree-frogs (Hylidae) as 2% of the food of *Monticola rupestris*. As regards *Monticola saxatilis,* the capture and eating of 4 vertebrates has so far been established—and partially, too, documented by photographs: the lizards *Lacerta agilis* (plate 36), *Lacerta muralis* (plate 33) and *Ablepharus kitaibeli*; and the European Tree Frog (*Hyla arborea*). Caged Rock Thrushes kill and rend young Green Lizards (*Lacerta viridis*) thrown to them; I once threw to a Rock Thrush a young female lizard of this species—about 10 centimetres long—that had died shortly before. Although the lizard was already half-stiffened, the bird showed a noticeable respect for this large item, but got it into position with a few strokes and then began eating it head first. After 5 minutes the tail was still hanging out of his beak. Ordinarily (when they are not in captivity), Rock Thrushes always go about the killing of a lizard with adroit jumps to the side, designed to avoid the bites and blows of their struggling prey. In such incidents the sportive grace of this bird is displayed to best advantage. It must here be observed, however, that the capture of lizards is not, with the Rock Thrush, of everyday occurence, and this fact must in no way prejudice our opinions as to the usefulness of the bird. Small frogs (*Hyla arborea*) appear much more rarely and are killed only by chance; I was more frequently able, however, especially during the breeding-period, to establish the eating of small snails (*Cepaea, Zebrina*). The high calcium carbonate content of these molluscs seems to me to have a certain attraction for the birds in this period.

(c) *Plants.*—The preference of the Rock Thrush for cherries (*Prunus cerasus* and *P. avium*) is undeniable. At Dunabogdány, where both types of cherry-tree abound, I was able to confirm this by observing the excrement—coloured purple by cherry-juice—of countless nestlings; also, the beaks and mouths of the feeding adults were coloured purple. On the other hand, there were some Rock Thrushes there at the same time who bore no trace of this habit. Lastly, the bird seems to show a remarkable taste for saxifrage. I saw grown fledgings pecking at the puffy leaves of this plant. When offered to tame cage-birds, such leaves were torn to shreds and the juicy parts eaten. TIBOR FARKAS

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NOTES ON THE AVIFAUNA OF THE SOVIET UNION WITH SPECIAL REFERENCE TO THE NEW RUSSIAN HANDBOOK

By G. P. Dementiev and N. A. Gladkov

The variety of nature in Russia, and her fauna in particular, has long since drawn the attention of both her inhabitants and her administration. Back in the 16th and 17th centuries, soon after the Russians had occupied Siberia, there arose the problem of investigating and exploiting the natural resources of the then unknown country. Thus, an extensive and systematic study of the fauna in Russia had already begun as far back as the 18th century, when numerous and well equipped expeditions were organized for this purpose, and in which the Russian Academy of Sciences, founded by Peter the First in 1772, played no little rôle. The results of these fauna studies were summed up by P. S. Pallas in his well known work under the heading *Zoographia Rosso-Asiatica.* The first two volumes of this work, in which the author gave a description of animals and birds, were published in 1811 in a small edition; and while the first list of birds in Russia published by I. P. Falek in 1786 enumerated only 222 bird species, the *Zoographia* by Pallas practically doubled this figure, increasing the list to the number of 425.

In Russia, this *Zoographia* was, during a lengthy period, recognized as the zoological handbook, and there is no doubt that its publication contributed no little to the further development of ornithological investigation in Russia. In the 19th century the study of birds in Russia already proceeded on a regional scale, some of these regions covering vast territories. As a result, there soon appeared Kessler's *Birds of the Ukraine* (1851), *Birds of the Caucasus* by Radde (1884), *Birds of the Orenburg region* by Eversmann (1855), Severtsoff's *Turkestan birds* (1873), *Eastern Siberian Birds* by Taczanovski (1891-1893), and others. At the close of the 19th and beginning of the 20th centuries, the number of similar works on bird investigations had increased both in quantity and quality, their publication being connected with such names as P. P. Sushkin, N. A. Zarudny, S. A. Buturlin and others.

This new trend in ornithological investigation was due, to a considerable extent, to the appearance of M. A. Menzbier's well known work *Birds of Russia* (1895), which contained what was for that time a remarkably complete critical analysis of data on systematics, geographic distribution and biology of birds in European Russia and the Caucasus. The great quantity of new faunistic data, however, which had accumulated since then, the reform in the systematics of ornithology, vividly expressed in the classical work *Die Vögel der Paläarktischen Fauna* by E. Hartert, the heightened interest in problems of general biology connected with bird study, and the widespread development of ecological investigations, in particular, had brought us to the point where Menzbier's *Birds of Russia* could no longer be considered as "up to date". It was apparent that the need for a new critical revision of all data dealing with the avifauna of this country had ripened. This task was rather a difficult one. Nevertheless, thirty years of intensive work on the study of ornithology in our country made it possible to solve this problem. And besides, the modern handbooks on birds of adjacent countries recently published such as *The Handbook of British Birds* by Witherby and his collaborators in the first place, and that of Niethammer on the birds of Germany in the second, were of considerable help to us in this work.

Several times in the years 1911-1916 attempts were made to compile a complete revision of bird species in Russia. The Academy of Sciences began issuing a series on *Fauna of Russia and adjacent countries* in which several bird groups (petrels, divers, grebes and falcons) were fully treated. But for various reasons this attempt, as well as subsequent ones, was not brought to a conclusion. Therefore, in order to solve this pressing problem, it was decided to begin making up a list of birds in the U.S.S.R., their distribution and description, combining it with keys. The work, under the heading *Complete Keys of Birds in the U.S.S.R.*, five volumes of which were published in the years 1934-1940, was compiled by the Moscow zoologists S. A. Buturlin and G. P. Dementiev. In this work, the authors had already brought up the number of bird species known to have occurred in the U.S.S.R. to the figure of 672. But the very mode of dealing with the bird problems, however, was too concise in form, and what is most important, no information dealing with the biology of birds had been given.

In order, therefore, to give a complete monographic description of the avifauna of the Soviet Union, the Moscow University zoologists went on gathering material of this kind, and even enlisted for this purpose several well known ornithologists from other institutions. The preliminary work progressed, and by the end of World War II, the publishing plan was finally fixed upon, and the treatment in the rough of several orders completed. This problem was discussed and approved at the conference of the biological section of the Moscow University held on 23rd December 1944.

Many zoologists, including professors of the Moscow University and other High Schools, participated in this conference. G. P. Dementiev was authorised by the conference to head this work, and when in 1946 N. A. Gladkov again resumed his work at the university, he, too, personally took part in it.

Of vital importance, when writing up this work, was the fact that the authors could refer to the collections of bird species available at the Moscow University Zoological Museum, in the creation of which the principal authors had taken a most active part. The number of specimens at this museum had considerably increased during the last thirty years. This increase is largely due to the fact that the numerous bird collections of S. A. Buturlin, G. I. Poliakov, V. N. Bostanjoglo and others were turned over to the museum. Of no less importance, however, were the expeditions equipped by the museum and the birds collected by its collaborators. The object of these expeditions was to study both the composition of the fauna species and their biology in various regions of the Soviet Union such as the Polar zone, the Caucasus, the deserts, the mountains and oases of central Asia, the Altai Alpines, the Trans-baikal, the Ussuri region and many others. Many groups underwent a thorough systematic revision on the basis of the material gathered in these regions, and in many cases it was possible to write up a comparative essay on the ecology of certain species and to determine the geographic variations in their ecology. Several corresponding members of the Museum had been sending us notes from the most remote parts of the country, the Kurile islands, the High Arctic latitudes, from Kamchatka, Sakhalin, etc. Of paramount importance was, of course, the scientific work which was conducted at the state reservations. Most of these reservations carried on their research work in close contact with the Zoological Museum of the Moscow University.

Thus was created the scientific base necessary to carry on work of this kind in Moscow; and we, of course, availed ourselves of the rich collections of the Leningrad Zoological Institute of the Academy of Sciences and of other collections as well.

To accomplish this work by the approximate time for which it was planned, we were obliged to enlist the services of many outside specialists. The principal authors issued invitations to all the leading ornithologists of our country to cooperate. And so, besides the Moscow University collaborators who headed the compilation, several ornithologists from other towns also took part.

In order not to delay the publishing of these volumes we were obliged, to some extent, to violate the sequence of arrangement of bird orders adopted in science, and to publish them as soon as they were ready for print; taking care, however, that the grouping of these orders did not deviate much from the commonly adopted arrangement.

In the six volumes of *The Birds of the Soviet Union,* now all published, are described the birds belonging to 26 orders with the number of species and subspecies totalling 1,297. The illustration of these volumes was effected by the most renowned animal painters of our country, including academician A. N. Komarov, V. A. Vatagin, N. N. Kondakov, V. F. Fedotov, and A. A. Kcleinikov.

When writing up these volumes the authors mainly devoted themselves to the problems of zoogeography and peculiarities of bird life. In dealing with the distribution they diverged from the routine commonly practiced in similar works, characterizing it not only by the areas, but by the biotopes and the features of seasonal distribution, too. The results of bird-ringing in the Soviet Union for the last 25 years were also made use of. The distribution beyond our country was described for each species, but this was done in the main according to data from the most reliable foreign handbooks recently published. No special critical analysis of foreign literature dealing with birds was attempted. Neither did we comment on subspecies found beyond the Soviet Union, whereas all subspecies in our country underwent a most critical revision, with the result that many of them were synonymized. A similar fate probably awaits some of the subspecies displayed by us on the maps for other countries (we again stress here, with no critical analysis), on which also are shown the revised ranges of the subspecies in the U.S.S.R.

In writing up the accounts of each bird, the authors made full use of the material and literature available. At the same time in a number of ways we could give only scanty information concerning the important question of the biology of the species and on the recurrent phenomena in particular. The authors in this respect hold to the opinion of N. A. Severtsoff, a founder of modern ecology, claiming that only from the recurrent phenomena may the problems of propagation, seasonal distribution and moult be considered. The food problem has not been widely discussed in *The Birds of the Soviet Union.* Although the authors tried their utmost to generalize this material, they nevertheless did it in the most possible concrete form proceeding from the theoretical point of investigation, thereby promoting the solution of such an extremely important problem as the geographic variability in the ecology of species, comparing these variations with certain morphological features of population, etc.

Considering the vastness of territory in our country and her variety of conditions, the generalization of data would have led to an absolute break from local features, and would have given nothing new to the student. But by outlining the material in a concrete form, the authors were able to point out what is known or not known about each phenomenon, imparting a more profound knowledge to the student; whereas, though a "generalization" of data does display a more or less fair knowledge, it, however, does not discover that which remains unknown and does not stimulate further investigations. The authors have expended much time and energy in drawing up maps of distribution of birds in the Soviet Union, as the task which confronted them was to illustrate not only the range of each species within the Soviet Union, but to display the range of all these species as a whole, at the same time reflecting as far as it was possible their seasonal distribution and geographic variety. It was the first time that work of this kind—the preparation of world distribution of 680 bird species—had been undertaken, and it is quite probable that in several cases some inaccuracy may have been overlooked; still, we believe that we have succeeded in outlining the main character of distribution correctly, and what is most essential, that the science of ornithology has at last acquired quite reliable data on geographic distribution for the vast territories of two continents.

The avifauna of the U.S.S.R., numbering 704 species, constitutes 8.16% of that of the world, assuming as a basis the calculations of E. Mayr (1946, *Auk*, vol. 63, pp. 64-69; 1951, *Amer. Mus. Novit.*, no. 1496, pp. 1-42). The perching birds form 43.1% of the total in the U.S.S.R., that is, relatively rather less than on a world scale (59%, according to Mayr). This is explained by the geographic position of the U.S.S.R. where the vast arctic and subarctic regions are sparsely inhabited by the Passerines. For the very same reason, the percentage of hydrophylic species and groups is relatively high. Thus while the Passerines in the U.S.S.R. total somewhat less than 6% of the world figure, the waders constitute almost 31.7%, while the divers even total 100%.

In the following table is given the number of bird species in the U.S.S.R. according to their families. The first column shows the total number of species in the world (according to Mayr); the second column, the number of species of each family met with in the U.S.S.R.; the third, the number of species breeding in the U.S.S.R.

TABLE—THE NUMBER OF SPECIES IN EACH FAMILY REPRESENTED IN THE U.S.S.R., COMPARED WITH THE WORLD TOTAL*

	World	U.S.S.R.	
	Total	Total	Breeding
Corvidae (crows)	100	14	13
Dicruridae (drongos)	20	2	0
Sturnidae (starlings, mynas)	103	6	6
Oriolidae (orioles)	37	2	2
Fringillidae (*sensu lato*) (finches, buntings. etc.)	426	73	68
Alaudidae (larks)	75	14	14
Motacillidae (wagtails, pipits)	48	14	14
Parulidae (New World warblers)	109	2	0

[*The sequence, nomenclature and treatment followed in this table differ in several ways from the normal used in Britain, but we considered it desirable that both the taxonomic and the general views expressed in this paper, which are entirely the authors' own throughout, should be left unchanged. In explanation, however, it should be pointed out that the swifts, grebes and divers follow the nomenclature which has long been used in America, though for the last of these the use of Gaviidae has already become the practice in *British Birds;* the barn-owls (Tytonidae) are separated from the rest of the owls (Strigidae); the Charadriidae here include not only the plovers, but all the Scolopacidae, i.e. the bulk of the rest of the waders; the skuas, which are normally separated under the Stercorariidae, are grouped with the gulls and terns (Laridae); more confusing, two of the three species of the east and south Asiatic family of parrotbills (Paradoxornithidae) which appear in the U.S.S.R. list are birds that we normally group with the tits (Paridae)—Bearded Tit (*Panurus biarmicus*) and Long-tailed Tit (*Aegithalos caudatus*). The order in this table is not unlike that in *The Handbook of British Birds*, but the sequence in current use in Russia approximates more nearly to the "Wetmore" and runs from the grouse to the Passerines (see D. D. Harber's review, *antea*, xlviii, p. 218).—EDS.]

	World	U.S.S.R.	
	Total	Total	Breeding
Zosteropidae (white-eyes)	80	1	1
Certhiidae (treecreepers)	6	4	4
Sittidae (nuthatches)	29	3	3
Paridae (tits)	64	12	12
Parodoxornithidae (parrotbills)	19	3	3
Laniidae (shrikes)	67	10	9
Campephagidae (cuckoo-shrikes, minivets)	72	1	1
Bombycillidae (waxwings)	3	2	2
Pycnonotidae (bulbuls)	109	2	0
Muscicapidae (flycatchers)	378	13	12
Regulidae (goldcrests)	5	3	3
Sylviidae (Old World warblers)	313	51	50
Turdidae (thrushes, chats, etc.)	304	50	46
Timaliidae (babblers, laughing thrushes)	282	1	1
Prunellidae (accentors)	12	8	8
Troglodytidae (wrens)	63	1	1
Cinclidae (dippers)	5	2	2
Hirundinidae (swallows, martins)	74	9	7
Micropodidae (swifts)	76	5	5
Picidae (woodpeckers)	210	14	14
Upupidae (hoopoes)	1	1	1
Coraciadidae (rollers)	16	2	2
Meropidae (bee-eaters)	25	2	2
Alcedinidae (kingfishers)	87	5	1
Cuculidae (cuckoos)	128	6	5
Caprimulgidae (nightjars)	67	3	3
Strigidae (owls)	123	17	17
Tytonidae (barn-owls)	11	1	1
Pandionidae (ospreys)	1	1	1
Accipitridae (hawks, harriers, eagles, etc.)	205	37	34
Falconidae (falcons)	58	10	9
Ciconiidae (storks)	17	2	2
Threskiornithidae (spoonbills, ibises)	28	4	3
Ardeidae (herons)	59	15	12
Phoenicopteridae (flamingos)	6	1	1
Phalacrocoracidae (cormorants)	30	6	6
Pelecanidae (pelicans)	6	2	2
Sulidae (gannets)	9	2	0
Fregatidae (frigate-birds)	5	1	0
Anatidae (ducks, geese, swans)	145	57	51
Procellariidae (petrels, shearwaters)	53	13	4
Laridae (gulls, terns, skuas)	89	35	32
Alcidae (auks)	22	18	16
Charadriidae (waders)	150	69	65
Rostratulidae (painted snipe)	2	1	0
Glareolidae (coursers, pratincoles)	16	4	4
Burhinidae (stone-curlews)	9	1	1
Otididae (bustards)	23	3	3
Gruidae (cranes)	14	8	7
Rallidae (crakes, rails)	132	11	10
Turnicidae (hemipodes)	15	1	1
Pterocletidae (sandgrouse)	16	4	4
Columbidae (pigeons, doves)	289	11	10
Colymbidae (grebes)	20	5	5
Gaviidae (divers)	3	3	3
Tetraonidae (grouse)	18	8	8
Phasianidae (pheasants, partridges)	174	12	12
Total (65 families)	5158	704	641

Of the 704 species recorded in the U.S.S.R. no less than 91.5% actually breed; these represent 26 orders of birds. Of the 641 breeding species 284 are Passerines. The number of monotypic species of all groups amounts to 246, or almost 35%. This considerable number is relatively bigger than that of the world avifauna, where the number of monotypic species totals only 25%, according to Mayr's calculation. This is partly explained by the fact that a great portion of the Soviet Union territory is included in the European and Asiatic sector of the Arctic and Subarctic zones, where the geographic variability is feebly marked.

It would be of general interest to mention here the comparison between the number of bird species and the mammals found in the U.S.S.R. relative to that of the world fauna. According to data presented by N. A. Bobrinski, B. A. Kuznetsov and A. P. Kysiakin in 1944, the number of mammal species in the U.S.S.R. amounts to 294, which is 8.4% of the world total of species of this class. This percentage is approximately the same as that of the bird species. In some respects this fact is rather interesting to note. One is under the impression that with regard to zoogeographical and ecological capabilities, these two distinct classes, so diverse in morphology and habitat, are in some ways quite alike, which is the more surprising as their mode of moving about radically differs one from the other.

NOTES

Movements of Manx Shearwater in St. George's Channel.—In view of the fact that few observations have been made on the movements of the Manx Shearwater (*Procellaria puffinus*) between Pembrokeshire and S.E. Ireland (R. M. Lockley, *antea,* vol. xlvi, supplement, p. 27), it may be of interest to record what I saw in this area in 1955.

On 28th May 1955 I was on board the steamer from Fishguard, Pembrokeshire, to Rosslare Harbour, Co. Wexford. Usually these ships cross during the hours of darkness, but we were running an hour late so I was able to begin watching at 03.30 hours (all times given are G.M.T.), when about half way across.

No shearwaters were seen from 03.30 to 04.15 (though light was insufficient for long range work before 04.00). Then a strong movement began. All shearwaters were flying N.W. or W.N.W. Between 04.15 and 05.10 (*i.e.* between 18 and 1½ miles E.S.E. of Rosslare Harbour), 225-250 birds were seen. The main concentration was during the period 04.40 to 04.55 (10 to 6 miles out) when about 150 shearwaters passed. Wind was light northerly, visibility good.

Later in the summer, while on Great Saltee, Co. Wexford, I tried to get more information. On 21st August I kept watch towards the south from the South Summit of the island between

05.45 and 07.30. During this time, 239 Manx Shearwaters were counted flying approximately west and 4 flying east. The westerly movement increased in rate to a peak about 06.30 and then decreased so that few were passing when I stopped watching. Wind was fresh (force 5) N.E., visibility good. On the following two days, Messrs. J. S. Furphy and W. N. Howe kindly joined me in making observations, but we saw no shearwaters at all. J. S. F. and I watched from 05.40 to 07.30 on 22nd August (wind light E.N.E., visibility 1 mile). On 23rd August J. F. S. and W. N. H. watched from 06.00 to 07.15 (wind light east, visibility 1-2 miles).

However, on two days very similar movements had been seen. The direction of both indicates that the birds came from the Skokholm/Skomer breeding colonies. Dispersal there takes place before dawn (*loc. cit*, p. 24). On 28th May, the peak occurred about ½ hour after sunrise, 50 miles N.W. of Skokholm. On 21st August, the peak came about 1¼ hours after sunrise, 65 miles W.N.W. of Skokholm. These figures correspond closely with those given by Lockley for other places at similar distances from Skokholm.

The irregularity of these movements towards the west from Pembrokeshire probably explains why previous observers at Tuskar Rock, Carnsore Point and Great Saltee have not seen large morning flights (*loc. cit*, pp. 27-28). The variable factor is presumably the wind. On both 28th May and 21st August 1955, shearwaters dispersing towards the north or N.N.W. from Skokholm and Skomer would have been drifted south and west of their normal routes. P. W. P. BROWNE

Purple Heron in Essex. — A Purple Heron (*Ardea purpurea*) frequented Abberton Reservoir, near Colchester, Essex, for at least a month in the late summer of 1955. It was encountered on a number of occasions between 22nd August and 20th September by Major-General C. B. Wainwright and B. Winchester, while P. J. Fenning and J. H. Sparkes saw it once. The bird spent most of its time in the reeds fringing the western end of the reservoir where it was often found perched on broken reed stems.

I had the bird under observation on 11th September. It appeared to be smaller and more slender than the Heron (*A. cinerea*) with purplish-brown upper-parts and sandy or buff under-parts from bill to breast. No trace of black colouration was visible either on the head or neck and thus it was taken to be immature. The wings appeared purple in flight save for the darker primaries and lacked the contrast to be found in the "Common" Heron. In flight the wing beats were rather quicker than the Heron's and the neck had a more pouched appearance.

The species has now been recorded twice at the reservoir in three years (see *antea*, vol. xlvii, pp. 350-351). Previously it had only been known to have occurred once in Essex. M. S. J. SNOXELL

Spoonbill in Staffordshire. — At Blithfield Reservoir, Staffordshire, on 25th June 1955, we noticed a large white heron-like bird fly in and land in a small bay. It was clearly an adult Spoonbill (*Platalea leucorodia*). We approached to within 100 yards and with the aid of glasses observed the crest, spatulate bill and black legs. On being disturbed it gave a grunt-like call and as it flew away we saw the neck extended in front and the black legs trailing behind. We are unable to trace any other recent record for Staffordshire. E. REEVE and T. W. FORD

[This appears to be only the second Staffordshire record of a species which is very seldom recorded in non-maritime counties.—EDS.]

Shelduck breeding inland in Somerset.—In view of the recent notes on the inland breeding of Shelduck (*Tadorna tadorna*) in Berkshire and the fens (*antea,* vol. xlviii, pp. 277, 362-363), it may be of interest to record a similar event in Somerset during the summer of 1955. At Chew Valley Reservoir, near Bishop Sutton, twelve miles from the coast, a single duckling, considerably less than half-grown, was seen with an adult Shelduck on a temporary island at the northern end of the reservoir on 17th July 1955. It was again seen on 24th July but not on subsequent visits.

This appears to be the first recorded occurence of the species breeding deep inland in the county, although Mr. A. E. Billett, in a personal communication, gives an unpublished record of a pair breeding three miles from the coast at Bleadon Hill, near Hutton, in 1945. BERNARD KING and R. H. POULDING

[As we go to press Mr. King informs us that Shelduck again bred at Chew Valley Reservoir in 1956, a pair and 8 ducklings being seen on 24th June.—EDS.]

Brent Goose in Staffordshire. — A small goose was seen on Blithfield Reservoir, Staffordshire, on 18th December 1955, and identified as a Pale-breasted Brent Goose (*Branta bernicla hrota*). The bird was swimming with Mallards (*Anas platyrhynchos*). Brent Geese are only exceptionally recorded well inland and this appears to be the first record for Staffordshire since 1922.

J. LORD and T. W. FORD

Goshawk in Cheshire.—Shortly after dawn on 25th December 1955, I had the good fortune to see a Goshawk (*Accipiter gentilis*) over Caldy Hill, near West Kirby, Cheshire. The bird was flying over the crest of the hill, remaining almost stationary against a strong west wind, and I was able to watch it for 4-5 minutes, at 20-30 yards' range, before it gave a quick wing-beat and stooped down the hillside at great speed. Through my binoculars I watched it flying well out over the Dee estuary in the direction of N. Wales.

I am familiar with the species, having previously seen birds in this country and also in Spain, and had no difficulty in identifying the bird as an adult female. The upper-parts were generally dark grey-brown, but there was a considerable area of white on the leading edge of the wing and lesser wing-coverts which was conspicuous, and a whitish stripe above the eye. The under-parts and under-wing were generally whitish, closely and finely barred, except on the under tail-coverts which were unmarked. There was, however, apparently some buff or greyish ground-colour on the flanks. The tail was broadly barred above and below. The bird was very large and at a glance I first took it to be a Buzzard (*Buteo buteo*) until I noted the long tail and relatively short, broad, "accipiter" wings. The only birds in the air near enough to serve for size comparison were two Herring Gulls (*Larus argentatus*); whilst shape and build were entirely different, the birds were of the same order of size. There was no trace or sign of jesses or other indication of captivity and it has been ascertained that neither the local zoo nor a local owner of Goshawks had lost a bird. R. J. RAINES

[In recent years Goshawks have been recorded with some regularity in the south-eastern corner of England, in certain counties east of a line from the Wash to Bournemouth (though it is of course not known how many of these birds have escaped from captivity), but in the west and north-west the species remains a very rare vagrant.—EDS.]

Crane in Outer Hebrides.—On 20th May 1953, D. J. Mackinnon and I went in search of a large bird—"like a heron but much bigger"—which had been reported to have been frequenting the west coast of Benbecula since 21st April. We found the bird without difficulty, for it was very conspicuous, on the stretch of machair south-west of Castle Borve. We had good views of it on the ground, where it was feeding, and in flight, under good conditions, but the bird, which was a Crane (*Grus grus*), was very alert and owing to the absence of cover we were unable to get nearer than about 200 yards. The next day, however, I had perfect views from within 70 yards. On the morning of 22nd May, it was feeding close to the main road, but when I returned three-quarters of an hour later with E. M. Nicholson and A. B. Duncan it had disappeared; we heard subsequently that it had been disturbed and had departed northward shortly before we arrived.

On 24th May, when in North Uist, quite by chance we found the Crane again, on the machair west of Knockintorran, some ten miles north of its Benbecula haunt, and once more splendid views were obtained, Duncan stalking within 40 yards. Details noted previously were confirmed; the bird was evidently not fully mature, for although the elongated, pendulous inner secondaries were well developed, there was no trace of red on the crown, and much of the upper-parts was a pale buff and not slate-grey. Apart from the absence of red on the back of the crown, head, neck and throat were as described for adult birds. The bill was whitish-horn in colour, and the legs and feet greyish-black.

Whilst on the ground, the Crane appeared to provoke no hostile reaction in the abundant population of breeding birds on the machair, but whenever it took wing, which was fairly frequently, it was subjected to fierce mobbing. In Benbecula, where the breeding population of Lapwings (*Vanellus vanellus*) is dense, its flight produced remarkable demonstrations, and once when it flew near the Castle loch it was attacked by a mob of Black-headed Gulls (*Larus ridibundus*) and Common and Arctic Terns (*Sterna hirundo* and *macrura*) which breed there.

The Crane was reported to have remained near Knockintorran, North Uist, for a few weeks, and then to have returned to Benbecula, where it was last seen at the end of September. There is a previous record for the Outer Hebrides, one having been shot near Stornoway, Lewis, on 14th May 1906 (*Annals of Scottish Natural History*, 1907, p. 84). JAMES W. CAMPBELL

Some field-notes on the Caspian Plover. — The arrival of a "trip" of Caspian Plover (*Charadrius asiaticus*) at Dar es Salaam, Tanganyika, on 18th September 1955, enabled some additions to be made to the few published field-observations on this species (including those by the writer in *The Handbook*).

Jackson (1938) mentions only one record of this species from the East African sea-board (an exhausted bird) and quotes Meinertzhagen (1930) to the effect that the coast is avoided except for stragglers and that arrival in its winter-quarters is to be expected in early November. One occurrence in September, at Lake Naivasha, Kenya, is however listed. Grant and Mackworth-Praed (1952) give October as the arrival-date and indicate that short and often burnt grass of the inland plateaux is the preferred winter-habitat. Benson's record of occurrences in Northern Rhodesia as early as 25th August, as well as 10th October, has only recently been published (1955).

The appearance of a trip in the centre of the town of Dar es Salaam so early as the middle of September was therefore entirely unexpected and it is of interest that, although it was at least six years since the species had come under the writer's notice, and although none of the birds showed any trace of summer plumage, they were at once identified without difficulty or glasses at a range of fifty yards. Subsequently the birds, whose tameness was equal of that of Dotterel (*Ch. morinellus*), allowed approach to within ten feet.

It is indeed with the Dotterel that the only possibility of confusion in winter-dress arises. The Caspian Plover can, however, be distinguished immediately by the forehead, which in winter or immature plumage is in fact creamy-buff, but looks white at a distance. The white of the forehead, continuous with that of the eye-stripe, lores and cheeks gives a white-faced appearance to the bird even in flight and sets off the dark smudge through the eye in a quite distinctive manner. At close quarters there are of course many other points of difference from the Dotterel (e.g. the lack of a dark subterminal band in the tail), but it should be noted that the difference in the colour of the feet referred to in *The Handbook* and by Meinertzhagen (1930), is an unsafe guide. The Caspian Plover's are sometimes much more yellowish than greenish-grey, probably a sign of immaturity as with the Dotterel.

The trip, although it gradually dwindled from eight to four birds, remained at least a week in Dar es Salaam, showing a very marked preference for a hockey-pitch. Its second choice was a not far distant football-ground, and only when disturbed would it settle for a while on the surrounding golf-course, though the short grass of the fairways looked much more attractive than the hard beaten, and in places bare, surface of the playing-fields. At high tide the plovers would be joined by, and associated closely with, about 20 Ringed Plover (*Ch. hiaticula*) from the beach near-by. In flight at a distance the Caspian Plovers could be picked out from the flock of Ringed Plovers, which they tended to "lead", not so much by the slightly larger size as by their darker appearance from below. On the ground the Caspian Plover's up-right. "long-necked" stance is entirely different from that of the ordinary "sand-plovers" and for this reason the Great Sand Plover (*Ch. leschenaulti*) which, as Jackson observes, resembles the Caspian in colour and is not very much smaller in size (but is darker about the face and whiter below with a more sharply defined band across, or sometimes only on either side of, the breast) should never be confused with it. For this reason also, I consider the retention of the Caspian Plover in the separate genus *Eupoda* preferable to including it, with the Dotterel and Golden Plovers, in the genus *Charadrius* or "sand-plover" group, as is now generally done following the most recent B.O.U. *Check-List* (1952).

The frequently uttered flight note was again recorded as a sharp "kwhit" sometimes with a slightly spluttering quality—"ptrrwhit"—and by no means the "soft piping" described by Jackson. When nervous at one's approach individual birds would frequently settle down in a mock brooding attitude; occasional bobbing and wing-stretching were also noted. H. F. I. ELLIOTT

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Great Skuas on the Scottish mainland.—Previous attempts by the Great Skua (*Stercorarius skua*) to breed on the Scottish mainland in 1949, 1951 and 1952, have been placed on record by I. D. P. (*antea*, vol. xlvi, pp. 262-263). The following additional information relating to 1955 has been received by B. L. S.

Whilst searching for Arctic Skuas (*S. parasiticus*) on the Scottish mainland during late May 1955, Mr. Peter T. Wilson saw a pair of Great Skuas, and on 1st June he found a nest containing one egg. This nest was re-examined on 6th and 9th June when it still contained only one egg. He was unable to visit the area again, and the fate of the egg is not known. This site was situated about one mile north of the previously recorded nesting-area.

From information obtained locally by I. D. P. it appears that three Great Skuas, sometimes more, were seen in this district throughout the summer, the three birds frequently being together. It has not been possible to ascertain whether or not the odd bird was a juvenile. BRYAN L. SAGE and IAN D. PENNIE

REVIEW

LOCAL REPORT

THE WEST MIDLAND BIRD REPORT 1953 (48 pages, 3 half-plates) and 1954 (64 pages, 2 half-plates). Editor: J. Lord, 369, Chester Road, Boldmere, Sutton Coldfield. Obtainable from J. Sears, 5, Acheson Road, Hall Green, Birmingham 25. Price 6s. each.

THE Birmingham and West Midland Bird Club is one of the strongest in the country with membership approaching 500. Its Reports are substantial and well-produced, covering the counties of Warwick, Worcester and Stafford. Classified notes form the main part of the Report and follow the sequence and names used in the *B.O.U. Check-List* of 1952. Under each species notes referring to each county are listed separately, but not all of the commoner species occuring within the area are mentioned. No indication is given about the standards applied in accepting records, nor whether records are assessed by the editor alone or whether he has the help of a committee; clearly, in a club of this size, no one man can really know the capabilities of all members. In the case of some rarities supporting details are given, but there is no information on how several autumn Arctic Terns were identified. A new Staffordshire reservoir, Blithfield, contributed a number of interesting records in 1954.

In addition to the classified notes there are articles, in the 1953 report on "Breeding birds of the Tamworth district" and "Notes on seasonal population distribution of Curlew"; and in the 1954 report on "Birds of the Malvern district", "Migration of Swifts in north Warwickshire" (5 pages), "Buzzard Survey 1954", and "Birds of Cannock Reservoir" (7 pages). Both Reports contain tables of migrants' arrival and departure dates.

In the 1953 report the following records may be mentioned:—Slavonian Grebes in Staffordshire in February, October and November. Little Grebes hatched on late date of 30th September (Staffordshire). Cormorant in Staffordshire with characteristics of Southern race on 30th March. In September one Shag in Warwickshire and 2 in Staffordshire. A Bittern at Aqualate (Staffordshire) in December. A Green-winged Teal in Warwickshire (*antea,* vol. xlvii, p. 244). Garganey bred in Warwickshire. The Ferruginous Duck recorded in Worcestershire in 1951 is now to be placed in square brackets. Goldeneye at Bellfields (Staffordshire) reached 70 in January. 5 Long-tailed Ducks recorded (Warwickshire, Staffordshire). A Velvet Scoter at Upper Bittell (Worcestershire) in December. Flocks of White-fronted Geese in January (Worcestershire) and October (Staffordshire). Bewick's Swans in Staffordshire in January and December. Buzzards recorded breeding in one or two localities in Worcestershire. A Kite over Cannock Reservoir (Staffordshire) on 4th August. A bird is recorded (in square brackets) as a Marsh Harrier in Staffordshire on 15th November on what appears to be very slender evidence. A Hen Harrier was seen later in the month, also in Staffordshire, and a Montagu's in Warwickshire in April. Osprey in Warwickshire in May and in Worcestershire in September. Quail heard at several places in each of the 3 counties during summer. Oystercatchers in all 3 counties but principally Staffordshire. 4 Little Ringed Plovers in Staffordshire on 20th August. Golden Plovers of the Northern race in spring (Staffordshire). Several Turnstones in Staffordshire. 47 Whimbrel at Bellfields (Staffordshire) on 23rd August. Black-tailed Godwits in March and May, and a Bar-tailed in August (all Staffordshire). Green Sandpiper in winter in all 3 counties. Spotted Redshank in Warwickshire in August, and in Staffordshire in May, August and October. Knot in Worcestershire and Staffordshire in October; Sanderling in both these counties. Great Black-backed Gulls in Warwickshire in February and September and in Staffordshire February-May and October-December. A pair of Common Terns again bred successfully in Staffordshire. A Little Tern in Warwickshire in September, and in Staffordshire in September and on 1st October. A party of 24 Sandwich Terns near Coventry (Warwickshire) on 9th September, and others in Warwickshire and Staffordshire in May, July and September. A Razorbill in Worcestershire in May. A Tawny Owl nested on the ledge of a house in Birmingham (Warwickshire). A Hoopoe in Worcestershire in April. A Swallow roost at Wychall reservoir (Warwickshire) was estimated at 15,000 on 17th September. House Martin at Nuneaton (Warwickshire) on 16th December. Ravens in Worcestershire in March, April and July. A Worcestershire Rookery was built amongst girders supporting insulators. About 50 Magpies occupied a Worcestershire roost in January A Worcestershire Blackbird was brooding 4 eggs on 30th December (this is additional to the records of winter nesting given *antea,* vol. xlviii, pp. 124-125). Black Redstarts nested in the centre of Birmingham (Warwickshire). Marsh Warblers recorded in Worcestershire and bred in S. Staffordshire. A description is given of a Tawny Pipit in Staffordshire on 29th December (*antea,* vol. xlvii, p. 443). Variant Yellow Wagtails were seen in May in Warwickshire and Staffordshire. Great Grey Shrike in Warwickshire in October. A flock of about 350 Tree Sparrows in Staffordshire on 28th March.

The 1954 Report includes the following records:—Black-throated Diver in Staffordshire in January and December, and Great Northern Divers in the autumn. At Blithfield reservoir (Staffordshire), which had begun to fill only 18 month previously, there was a colony of at least 30 nests of Great Crested Grebes in a small area, and 335 birds on 25th August; a Red-necked Grebe there in September and October. Slavonian Grebes in Staffordshire in December. Black-necked Grebe bred in Warwickshire for the first time. A Gannet at Bittell reservoir (Worcestershire) on 28th July. Several Shags in Staffordshire in the autumn. Garganey in Warwickshire, April-June. Pintail reached 36 at Blithfield (Staffordshire) in December. Several Scaup were seen in each of the 3 counties, notably 3 drakes in July at Alvecote (Warwickshire), where also Pochard bred. Long-tailed Duck in Staffordshire in January, April, November and December. A pair of Red-breasted Mergansers on 25th April: the first Warwickshire record for over 50 years. A number of records of Shelduck in all 3 counties. Grey Lag Goose in Staffordshire. One, probably 2, pairs of Buzzards bred in Warwickshire, 13 pairs (plus probably another 7-11 pairs) in Worcestershire, and one pair in Staffordshire. A bird thought to be a Goshawk in Worcestershire on 14th May. Marsh Harrier at Alvecote (Warwickshire) on 8th May, and an Osprey in Staffordshire in August. Hobby in Worcestershire on 27th June. Small numbers of Red Grouse on Cannock Chase (Staffordshire). 8 Black Grouse at a N. Staffordshire "lek". Oystercatchers seen in each of the 3 counties. Little Ringed Plovers on several dates in Worcestershire and Staffordshire. A Grey Plover at Blithfield (Staffordshire) on 1st October. Two parties of Golden Plovers of the Northern race identified in spring (Staffordshire). A Great Snipe in Staffordshire on 25th April. Curlew extending range, breeding in many areas. Black-tailed Godwit in Worcestershire in May, and one in September at Blithfield (Staffordshire) where also Bar-tailed Godwits in May and September. Spotted Redshank in Warwickshire in September and October. Knots seen in all 3 counties. Little Stint, unusual in spring, at Cannock reservoir (Staffordshire) in April and May. Great Black-backed Gull in Staffordshire through the summer, also seen in spring and winter. 2 adult and an immature Little Gull at Blithfield (Staffordshire) on 3rd September; Kittiwake there in April, September and December, also in Warwickshire in December. Marked concentrations of Black Terns on 9th May and 5th August, when about 100 and 200 birds respectively in the area of the 3 counties (cf. *antea*, vol. xlviii, pp. 148-169 and 300-307). Arctic Terns reported in spring and autumn without observer or features being mentioned. Little Tern in April in Warwickshire and 3 as late as 30th October in Staffordshire. 5 Sandwich Terns in Staffordshire on 2nd July. Hoopoes in Warwickshire in April and October, and one in Worcestershire in May. Ravens in Worcestershire in April and December. Black Redstarts in winter in Warwickshire and Worcestershire. Marsh Warblers increased in Worcestershire: at least 6 pairs in one locality. Garden Warbler with aberrant song reappeared for 4th year near Kidderminster (Worcestershire). A winter Chiffchaff in Warwickshire on 6th February. Very late Yellow Wagtails were seen, 2 in Warwickshire on 29th October and one on 30th, and 2 in Worcestershire on 4th November (*antea*, p. 79)—but the latest date given in the table of migrant departures at the end of the Report is 13th October. Blue-headed Wagtails in Warwickshire in April and June. A party of 21 Bullfinches in Staffordshire on 22nd December. A Snow Bunting at Cannock reservoir (Staffordshire) on 10th March. P.A.D.H.

LETTER

THE COLLECTION OF RECORDS FOR ANALYSIS

SIRS,—May I, without returning to a controversy in which both sides have stated their case, make two further remarks of a general nature on points that have arisen out of the paper by Alec Butterfield and Kenneth Williamson on Black Terns (*Chlidonias niger*) in autumn 1954 (*antea*, vol. xlviii, pp. 300-307)?

Papers of this sort depend on a large number of observations from widely scattered amateurs; it is therefore obviously most important that the writers should receive all the material in time to incorporate it fully into their analysis. It is, in this case, a matter of opinion how far the omitted records affected the writers' picture, but I fear such omissions will inevitably multiply as this type of paper becomes commoner, unless steps are taken to prevent them.

At present, a request for information appears in *British Birds*, a cross-section of observers read it, a small number take notice of it and fewer still comply—and those who do are not necessarily the most competent or the most knowledgeable about local conditions. This cannot fairly be attributed to mere apathy: even the most public-spirited field naturalist finds his time and enthusiasm for correspondence flagging in face of five or six enquiries of this sort a year (to say nothing of separate B.T.O. enquiries and anything for which the local club may be asking). On the other hand, almost everyone takes the trouble to send notes to the Editor of their local report at the end of the year. Consequently, the total of records printed there is much fuller than those on which the paper concerned is originally based—the 1954 reports of

23 AUG 1956
PURCHASED

Cambridge, Essex, Leicester and Norfolk, to take a random sample, demonstrate this with the Black Tern enquiries both for spring and autumn of that year.

My first plea, therefore, is for the closest possible co-operation between the editors of local reports and the authors of analytical papers. Though local editors are much overworked, they usually have one or more assistants who are, like themselves, thoroughly familiar with local conditions: surely it would be worthwhile appointing a *British Birds* representative for each area who can assess the information as it is received in the local files, and thus make sure the writers get *all* the information *properly sifted*. Such a man would be able to extract material from active local observers before the end of the year, so there need not be a longer delay in collection than there is at present. The system would have the overwhelming advantage that the writers could speculate from the most complete information possible.

Secondly, it has recently sometimes been the policy of *British Birds* not to publish in full this collected data, largely for the very pressing requirements of space. This, however, involves a sacrifice. The critical reader can no longer see for himself on what the generalizations are based—awkward gaps or conflicting material can, perhaps unconsciously, be glossed over by a vague phrase, to suit a theory or make a picture more shapely defined than it should be. A false impression may then be made which cannot be contradicted, and at least until a better liaison between observer and writer is established, I feel that inability to examine records must lead to a loss of confidence in any analyst's conclusions. T. C. SMOUT

[Mr. Smout has raised some important issues, but we do not feel that his suggestions amount to a satisfactory solution, particularly where he proposes area representatives of *British Birds*. This would conflict with the settled and successful policy of supporting and working with Editors of local reports in their efforts to raise standards and to improve coverage of local ornithology in as many areas as possible.

We recognize that not printing full details in *British Birds* is open to the objections stated, but these would be met if all organizers of investigations would deposit with the Edward Grey Institute, Oxford, at least one copy of all material used. The whole set of data would then be permanently accessible for critical inspection without overtaxing our space and the patience of our readers by publication to the last detail. Ornithology is one of the leading sciences in adopting this commonsense system which will have to be increasingly used.

For various reasons the number of such investigations has recently been a heavy burden on all, and it is to be hoped that the experience gained will enable future investigations to be kept within the capacity of observers and editors to handle, and will make full use of local reports even at the cost of some delay.—EDS.]

BINDING

The Publishers regret that it is still impossible to bind volume xlviii (1955) of "British Birds" as the Index has not yet been published, though it is hoped that this will appear at the beginning of September. Meanwhile, this delay has given us an additional reason for considering the possibility of

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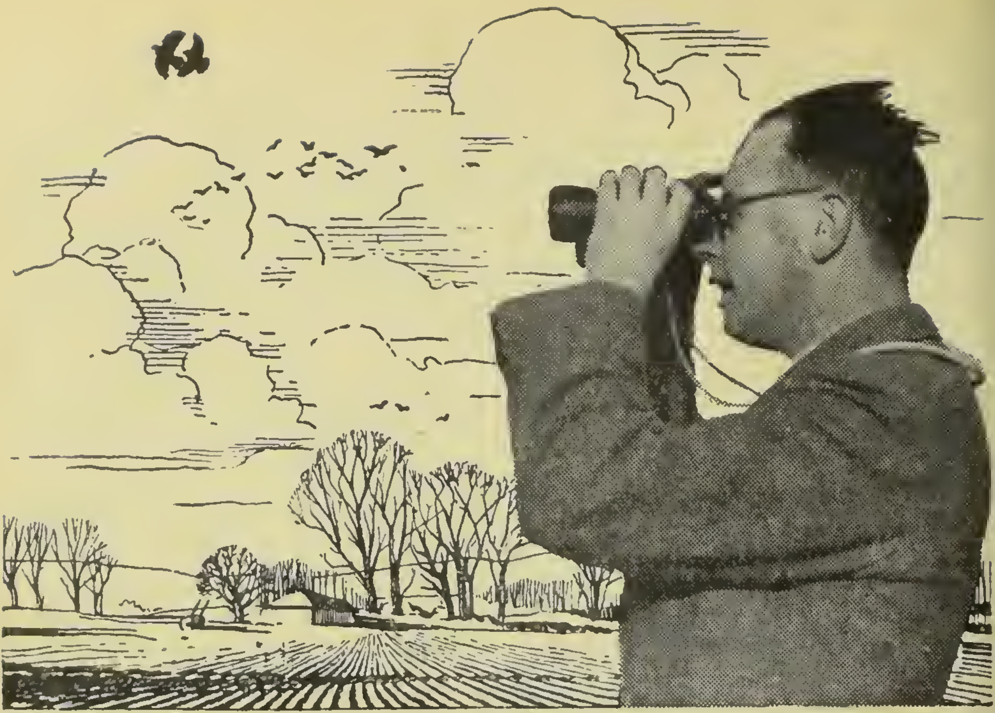

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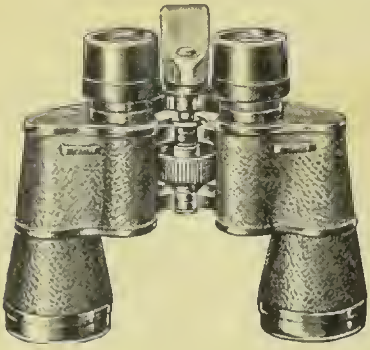

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Cover photograph by Eric Hosking: Peregrine (*Falco peregrinus*) at eyrie

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THE CROSSBILL INVASION OF GREAT BRITAIN IN 1953

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(1) INTRODUCTION

The first recorded invasion of Britain by Crossbills (*Loxia curvirostra*) appears to be that reported by Matthew Paris (quoted in Newton's *Dictionary of Birds*), referring to the year 1251 when the orchards of England were ravaged by the birds in their search for the seeds of apples. Since then similar invasions have occurred at intervals; in recent times 1909, 1927, 1935 and 1942 were "big years".*

As Lack (1954) has pointed out, two theories have been put forward to explain irruptions: (1) that they follow an exceptionally successful breeding-year; and (2) that they are correlated with the failure of a food-crop. He concludes that although both views hold some truth, neither gives a full explanation of the phenomenon. Williamson (1954) mentions both these factors and postulates a third—weather; in particular the development of anticyclonic conditions over the breeding-area. Such a situation did obtain in the relevant period of the summer of 1953. Williamson points out that the coincidence of all the factors is sufficiently unpredictable to account for the irregularity which is a feature of the occurrence of irruptions.

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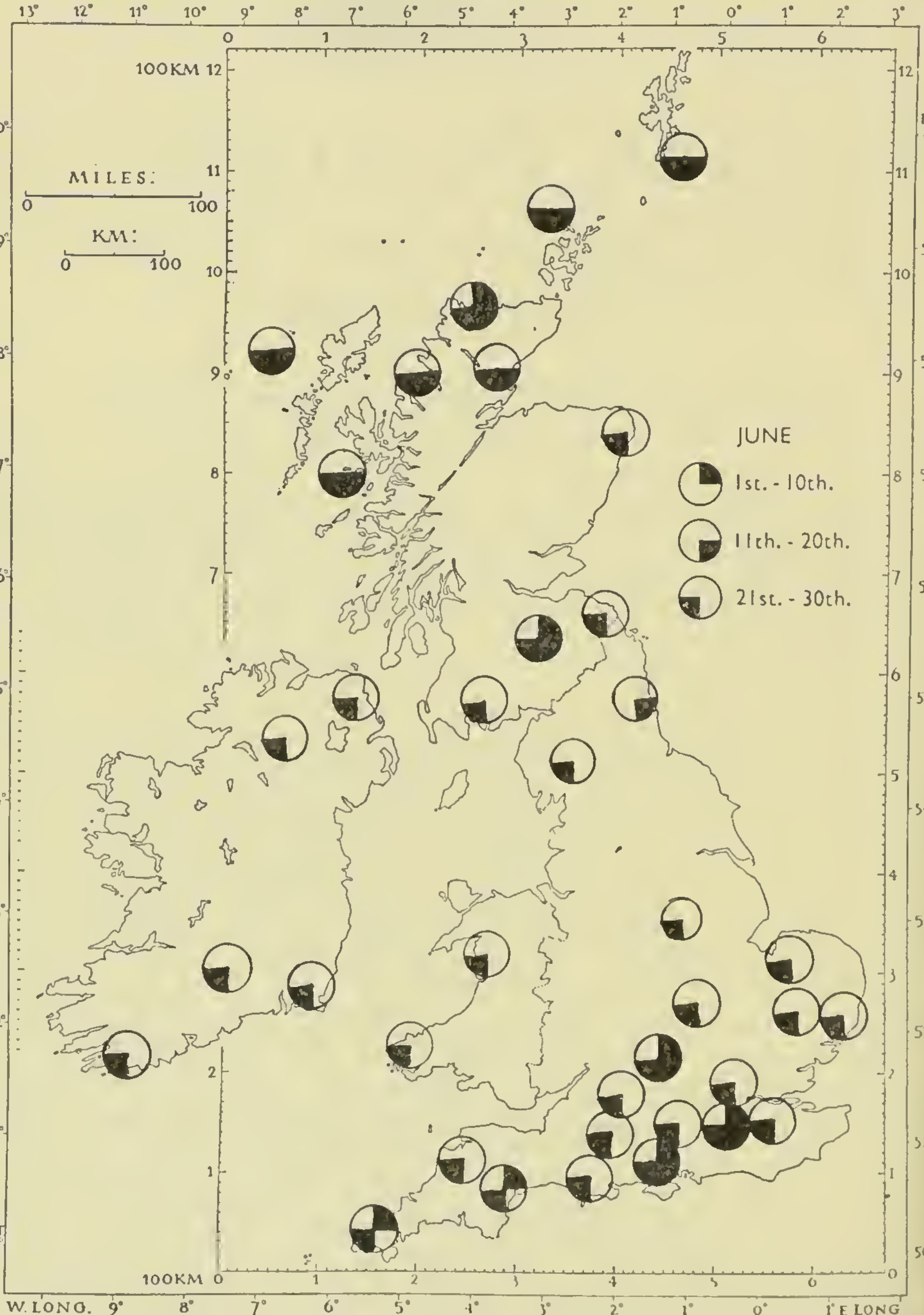
*As we go to press, records are coming in which show that 1956 is to some extent another "Crossbill year"; but from the information received so far it does not appear that the invasion is on anything like the scale of the 1953 one. Kenneth Williamson reports from Fair Isle (24th July) that about 15 Crossbills were seen there on 30th June 1956 and a few on 1st July; on the next day there was a flock of about 35 and some single birds; then came a big increase on the 3rd when a flock of over 200 of both sexes was noted; after that the numbers dwindled to some 25 and these disappeared about the middle of July. Records have also come from a number of other localities in Scotland, England and Wales, but these at the moment tend to support the impression that there was only one medium-sized wave of birds. We shall be glad to receive records from any area where there is no local report.—Eds.

Spruce seeds are a staple Crossbill food, both in the breeding season and outside it, and Svärdson (1955) says that the Swedish crop in 1952-53 was poor. The number of wintering and breeding Crossbills was also low, but between January and March 1953 hundreds of birds were seen in south Sweden, in a restless state and apparently unpaired. Svärdson comments that "their cluster-



MAP 1—TO SHOW DISTRIBUTION OF REPORTS OF CROSSBILLS (*Loxia curvirostra*) IN THE BRITISH ISLES IN JUNE 1953

The month has been divided into ten-day periods, which are differently symbolized.

ing in this coastal area was more like an arrested movement than normal breeding distribution". Birds began to leave Sweden, flying south and south-west, in May and June.

(2) THE INVASION IN BRITAIN

The first indications that 1953 was to be a "Crossbill year" in Britain came in June, and the peak occurred in July and August, thus following patterns of previous invasions (Witherby *et al.*, 1938).

In the reports received, there are records prior to June but they are scattered and several are from areas where Crossbills are normally resident; nor were any large parties seen except for a flock of 30-40 birds near Harrogate, Yorkshire, on 12th May.

June : Map 1 covers the month of June, which is divided into three ten-day periods, differently symbolized.

Only six counties reported Crossbills between 1st and 10th June:

South Hampshire—3 on 1st ; 1 on 2nd
Surrey—6-8 on 5th
South Devon—5 on 6th
Oxfordshire—6 on 7th
Cornwall—8 on 9th
North Sutherland—8 on 10th

From 11th to 20th June reports were at once more numerous and of larger flocks. The order of dates of first reports in this period is:

North Sutherland—10th
South Hampshire, Oxfordshire, Shetland—14th
East Sutherland—"mid June"
Northumberland, West Ross—16th
North Ebudes (Skye, etc.),* Orkney—17th
Outer Hebrides—18th

Flocks of more than 20 birds were seen in the following counties: East Sutherland (*ca.* 30), North Sutherland (30, 20, 20, 50), Shetland ("numerous" at various stations).

The last ten days of June produced reports from 36 counties, including 5 in Ireland and 11 in Scotland. The larger parties reported (in approximate date order) were:

Shetland—"numerous" at various stations from 16th
Orkney—"numerous" at various stations from 21st
East Sutherland—20 on 22nd
South Tipperary—13-14 on 22nd
South Devon—*ca.* 50 on 24th ; 24 on 27th ; 15 and 60 on 28th ; 23 on 30th
Antrim—21 on 25th-26th
Kirkcudbright—*ca.* 20 on 25th-26th
East Suffolk—up to 120 in "late June"
North Devon—15 on 28th-30th
Oxfordshire—20-30 on 28th
Dorset—30 on 28th
Nottinghamshire—15-20 on 28th
Tyrone—150-200 on 29th
Cornwall—25 on 30th

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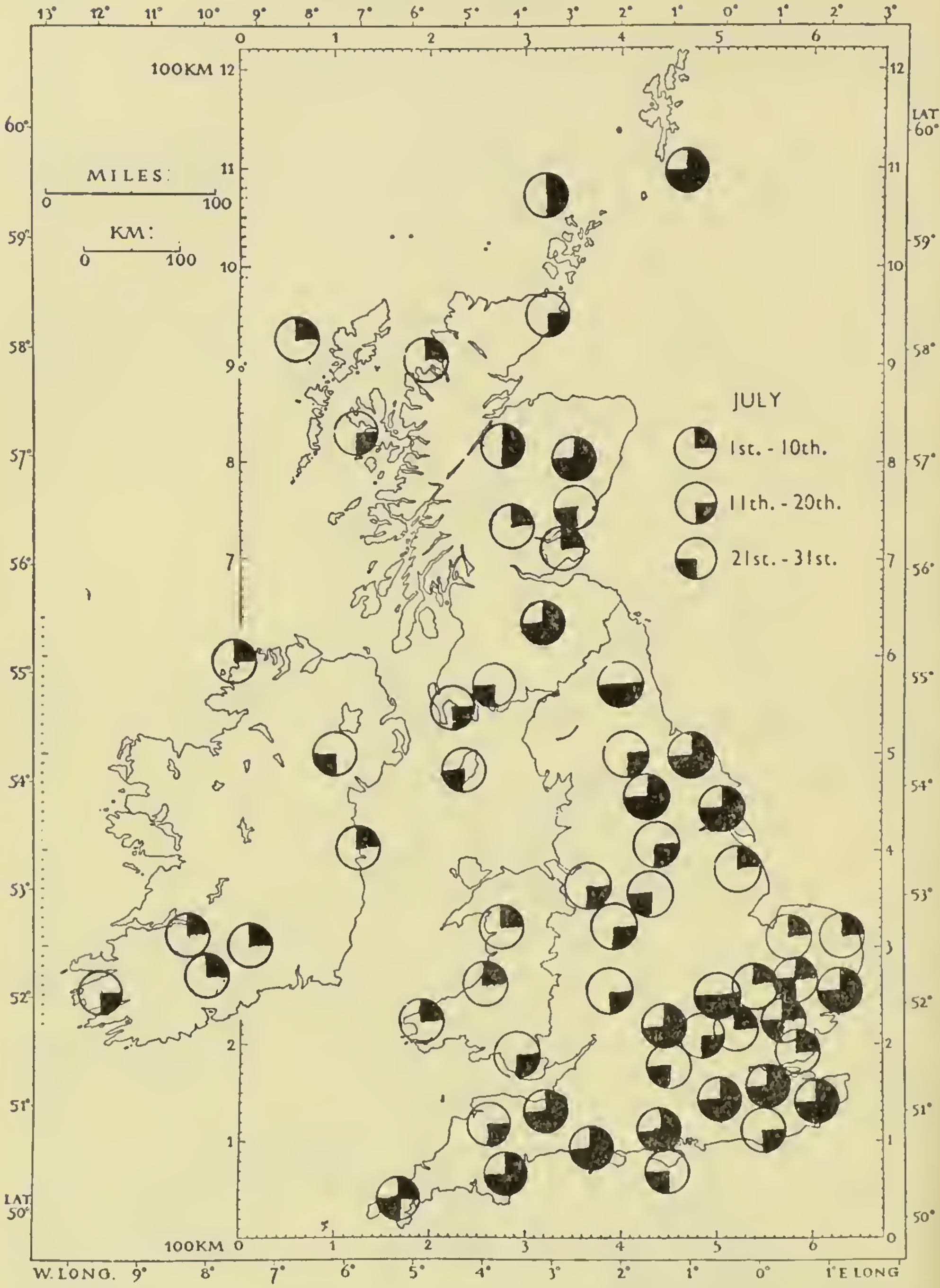
*The area names used throughout this paper are those of the vice-county system. Where any of these differ widely from the more usual county names, the latter are given as well, in brackets.



MAP 2—TO SHOW DISTRIBUTION OF REPORTS OF CROSSBILLS (*Loxia curvirostra*) IN THE BRITISH ISLES IN JULY 1953

The month has been divided into three periods, which are differently symbolized.

July : Map 2 covers July, this month also divided into three periods, of which the first contained most reports (from 38 counties). Some details are as follows:

South Devon—25, 34, 55 and 75 between 1st and 10th
Dorset—up to 40 birds from 1st to 10th
West Donegal—*ca.* 30 in "early July"
Shetland—small parties from numerous stations

Fife—up to 23 between 1st and 12th
East Cork—12-16 on 2nd
East Norfolk—25-30 on 1st and 2nd
West Suffolk—*ca.* 300 on 3rd
South-east Yorkshire—12 on 3rd ; 18 on 4th
Mid-west Yorkshire—15-20 on 3rd
Hertfordshire—30 plus on 4th ; *ca.* 30 on 10th
Merioneth—15 on 10th
Surrey—30 on 5th
Dublin—*ca.* 25 on 7th
West Ross—20 in "first week"
East Suffolk—50 on 7th
Cornwall—*ca.* 20 on 7th
South Essex—18 on 7th
North Essex—30-40 on 7th
South Tipperary—*ca.* 10 on 9th

In the mid-period of July, Shetland, Orkney, Caithness, North Ebudes (Skye, etc.), Easterness (E. Inverness and Nairn) and South Aberdeen each had some birds present, but the only large party in Scotland (up to 150 birds) was seen in Wigtown. The only Irish record was of one bird, in South Kerry. In England and Wales parties were for the most part of less than 20 birds, but South Devon reported up to 75 in a flock, Surrey up to 30, East Suffolk to 40 and Bedfordshire more than 100 on one occasion.

In the last part of July, 24 counties in England and Wales reported Crossbills, but flocks were generally small. Exceptions were South Devon (to 50), Surrey (30 plus), East Suffolk (to 25), West Suffolk (to 60), North-east Yorkshire (to 40) and Northumberland (30). Ireland reported only from Armagh. Shetland still had some Crossbills present, but other Scottish records came only from Aberdeen (up to 20 birds), Angus and Kirkcudbright.

August/September : Map 3 covers the two months of August and September, with different symbols for each.

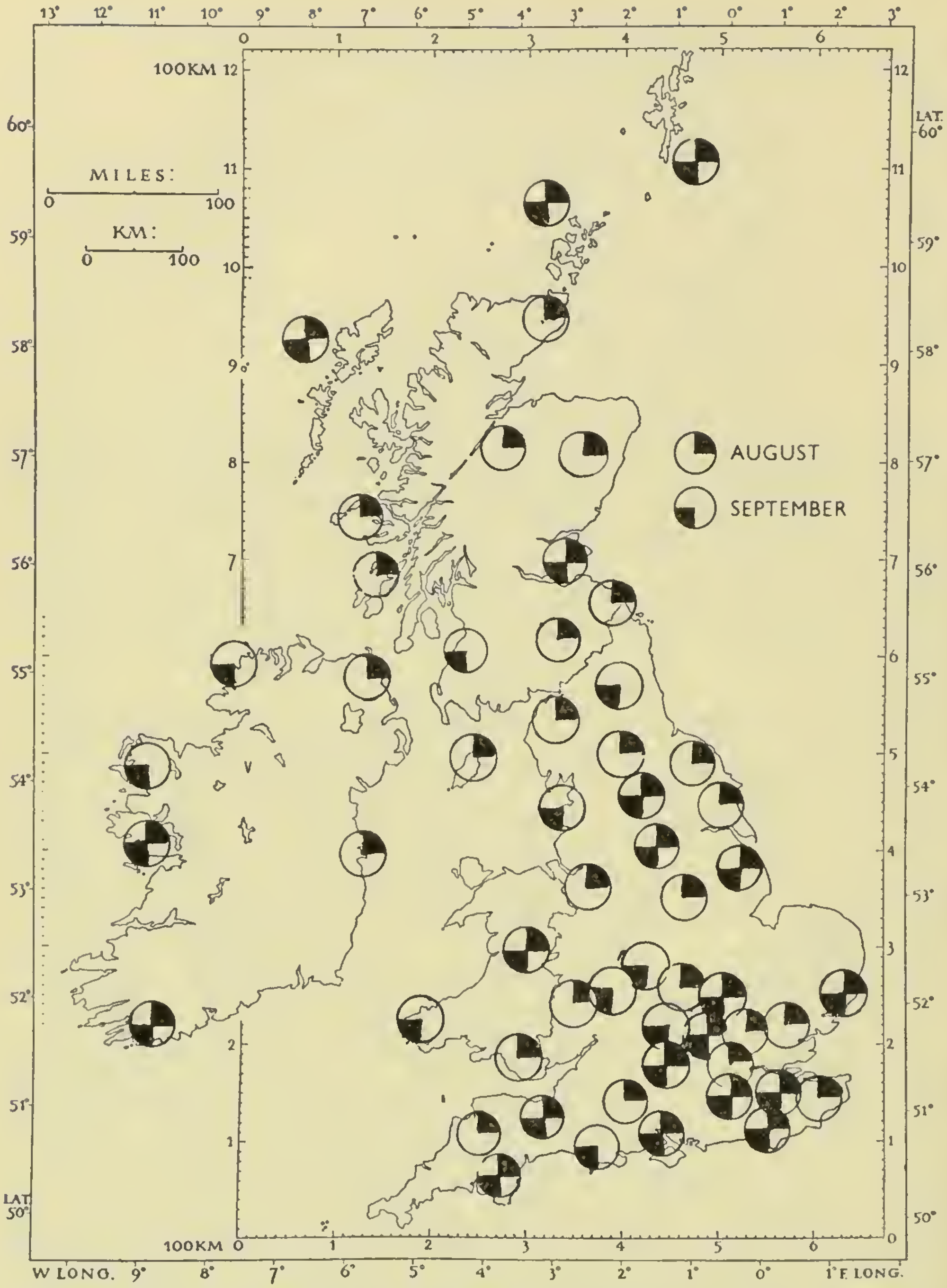
In Ireland, only Antrim reported more than small parties in August. In Scotland flocks were similarly small, Caithness (to 15) and Berwick (to 14) reporting the largest. In England and Wales the only counties reporting flocks of more than 20 birds were Hertfordshire (up to 50) and East Suffolk (to 25).

In September no flocks of more than 20 birds were reported and after September numbers everywhere continued to diminish steadily. It is worth comment that the falling off in numbers was far more gradual than the spectacular build-up. Lack (*op. cit.*) mentions this as a feature of irruptions.

(3) FOOD AND FEEDING

Little new has emerged from these records about food taken by Crossbills, and one must always be careful not to assume that because a bird is seen on a certain plant, it is in fact eating any part of that plant. Even if it is seen pulling a flower or seed-head to pieces, it may be eating the seeds or seeking insect life.

The vast majority of reports record the birds as on various species of conifers and dealing with the cones "in typical crossbill



Map 3—To show distribution of reports of Crossbills (*Loxia curvirostra*) in the British Isles in August and September 1953
Different symbols are used for each of the two months.

fashion''. There are many mentions of the tit-like acrobatics of the birds and of the use of the feet to hold cones while they are opened and the seeds extracted. And there is the usual comment on the wastefulness of the birds, with dropped but still intact cones thick on the ground. One observer saw birds hover in front of Douglas Fir (*Pseudotsuga douglasii*), the cones of which hang down from the underside of the extremities of branches; the cones were then nipped off and carried up to a solid perch for further attention.

Berries of various sorts came next in popularity. Among those mentioned are: Mountain Ash (*Sorbus aucuparia*), Honeysuckle (*Lonicera* sp.), *White Beam* (*Sorbus aria*), Elder (*Sambucus nigra*), Sea Buckthorn (*Hippophae rhamnoides*), Blaeberry (*Vaccinium myrtillus*) and the prostrate Juniper (*J. nana* or *sibirica*). Under berries one may include the Tomato; a bird was taken in a greenhouse while feeding on this fruit.

Other plants on which birds were seen include Thistles (*Carduus* sp.), Knapweed (*Centaurea* sp.), Dandelion (*Taraxacum officinale*), Dock (*Rumex* sp.), Plantain (*Plantago* sp.), Ragwort (*Senecio* sp.), Bog Cotton (? *Eriophorum*), Umbelliferae (unspecified) and "small grasses".

As already remarked, it is not always possible to be certain whether birds are feeding on vegetation or on the small animal life therein, but some circumstantial evidence of the eating of animal food is of interest. "Aphids on plum trees" are recorded from Kent, and the caterpillars of the leaf-roller moth, *Tortrix viridana,* were apparently being eaten in Suffolk. Insect life taken from the undersides of birch leaves is also reported, and at Spurn Head (a treeless district) adults were recorded as licking insects from Carrot (*Daucus carota*) and Hemlock (*Conium maculatum*) and seeking food on the ground among Marram Grass (*Psamma arenaria*) while juveniles were feeding on withered curled-up leaves of Sea Buckthorn and on thistle heads.

The tearing of bark and lichen, presumably in seach of insects, is reported in several cases.

In Shetland, where crofters allow their cabbages to flower in order to obtain seed, Crossbills are reported as stripping the plants and some crofters netted their crops to save them.

Buds of spruce (*Picea* sp.) and Lombardy Poplar (*Populus italica*), and flowers of spruce, received attention and several cases were reported where apples (including Crab Apples) were destroyed to get at the pips.

Two birds were held captive for a time (one injured, the other so tame it would not go away). In both cases the birds took small seed (Canary mixture) and the second bird refused sunflower seed, recommended by a bird fancier. This bird would seem to hold the record for a varied diet which included sliced apple, banana, chickweed, hard crusts of bread and cheese spread. The temporary hostess wrote that the bird would lick it off the bread eagerly, "her little tongue coming in and out between the mandibles".

An interesting account was received of birds giving concentrated attention to Norway Spruce (*Picea abies*) infected with a canker. The canker was sent for identification and proved to be *Adalgis abietis,* made by a very small aphis, and the birds seem to have expended quite incommensurate energy on such minute prey.

The 1953 Crossbills maintained the species' reputation for thirstiness and there were innumerable reports of their coming to drink from all sorts of water supplies, large and small. The tameness of the birds was also once again an outstanding feature.

(4) MISCELLANEOUS

Although there are constant references to typical Crossbill call-notes, reports of song are few. A Surrey record spoke of a song uttered near sunset; it lasted for some 15 minutes and introduced (*inter alia*) the notes of a Blackbird (*Turdus merula*) about to roost. An Irish report describes the song of a male as "Sree, sree, sree, shwit, shwit, shwit, sweedle, sweedle, sweedle, sree" and a shorter more excited version of the same song ending in an explosive "burrrr".

There were few reports of Crossbills associating or coming into conflict with other species but they were on occasion seen in flocks with Chaffinches (*Fringilla coelebs*) and sparrows (*Passer* sp.) and they caused resentment in breeding male Siskins (*Carduelis spinus*) into whose territory they trespassed.

(5) ACKNOWLEDGEMENTS

The original collection of the data on which this report is based was done by J. H. R. Boswall and all are indebted to his industry in this respect. Appeals in a wide variety of ornithological and natural history periodicals resulted in information being gathered from nearly 400 observers, whose names are given in the Appendix which appears below. Unfortunately, the resulting mass of material was so great that Mr. Boswall was not able to devote the time to complete the analysis and at the end of 1955 the task was taken over by the present author. Particular acknowledgement must also be made to Dr. Bruce Campbell whose efforts through the British Trust for Ornithology resulted in the gathering of many records which might otherwise have been lost.

I am indebted to the late Commander A. W. P. Robertson for guidance as to the general line the report might ultimately take and for discussion on some of the details later, and I owe much to Dr. R. A. Hinde for his suggestions, constructive criticism and encouragement throughout.

APPENDIX—LIST OF OBSERVERS WHO CONTRIBUTED RECORDS

Grateful acknowledgement is made to everyone mentioned here for their help in the compilation of this report. If there are any errors or omissions, it is hoped that those concerned will understand.

The complete file of records is being deposited with the Editors of this journal.

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ON THE MOVEMENTS AND SURVIVAL OF WOODPIGEONS AND STOCK DOVES

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M. W. Ridley and N. Ridley

The migration of the Woodpigeon (*Columba palumbus*) in the British Isles has long been a problem. It appears that the population, especially in the south of England, increases considerably each winter, and it has been generally supposed that British birds are joined by others from abroad, or from further north in Britain. Ringing recoveries do not suggest that either of these suppositions is correct. Lack and Ridpath (1955) have recently discussed this problem, and although they provide evidence for an apparent migration of this species within the country, they have no definite evidence of birds arriving from abroad, in spite of long and careful watches from ships and vantage points along the coast.

It is proposed here to discuss the data obtained from a total of 257 Woodpigeons and 57 Stock Doves (*C. oenas*) ringed since 1943 at Blagdon, Northumberland. Besides information on age

TABLE I—WOODPIGEONS (*Columba palumbus*) AND STOCK DOVES (*C.oenas*) RINGED AT BLAGDON, NORTHUMBERLAND, 1943-1952

(a) On monthly basis.*

Species	April	May	June	July	Aug.	Sept.	Oct.	Total
Woodpigeon	16	5	9	40	77	98	12	257
Stock Dove	7	3	4	25	10	8	—	57
Total	23	8	13	65	87	106	12	314

*NOTE :—These are all nestlings except the following Stock Doves : 1 adult and 1 juvenile in June, 7 adults and 3 juveniles in July, 2 adults in August, and 3 adults in September (total 17).

(b) On annual basis.†

Species	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	Total
Woodpigeon	23	30	23	—	75	39	20	2	42	3	257
Stock Dove	11	12	18	—	7	3	6	—	—	—	57
Total	34	42	41	—	82	42	26	2	42	3	314

†NOTE :—These are all nestlings except the following Stock Doves : 1 adult in 1943, 4 adults and 4 juveniles in 1944, 3 adults in 1945, 4 adults in 1947, and 1 adult in 1949 (total 17).

and survival, the movements of both species will be considered in some detail.

Table I shows the distribution of numbers of Woodpigeons and Stock Doves ringed on an annual and monthly basis. This is not intended to give a picture of breeding activity, as nest-searching was far from thorough throughout the season. Nests containing eggs and young were found from March to November in the case of the Woodpigeon, and from March to September in the case of the Stock Dove. The latter species commonly commences breeding in this area in early March. A larger proportion of nests found in August and September contain young, so that searching was intensified at that time. Most of the nests found were located in conifer plantations on a large estate where game is preserved.

Red Squirrels (*Sciurus vulgaris leucourus*) were common in some parts of the area, but the Grey Squirrel (*S. carolinensis*) was absent. Other possible predators include Carrion Crows (*Corvus corone*) in abundance; Magpies (*Pica pica*) and Sparrowhawks (*Accipiter nisus*) were frequently seen; and both Long-eared Owls (*Asio otus*) and Tawny Owls (*Strix aluco*) were common breeding species.

RECOVERIES

Of the 257 nestling Woodpigeons ringed, 41 (16.0%) have so far (8th March 1956) been recovered, compared with 3 out of 40 (7.5%) nestling Stock Doves. One other of the latter, ringed as an adult, has also been recovered, making a total for this species of 4 out of 57 (7.0%). This difference is probably due to the different behaviour and habits of the two species (see below). It is possible that a few more of these birds are yet to be recovered, but these are unlikely materially to alter the following conclusions.

MOVEMENTS

The directions taken by Woodpigeons recovered over 5 miles away from their place of birth are shown diagrammatically in Fig. 1. This shows that whereas only single birds were recovered from points N., N.N.W., W. and E., a total of eleven birds were reported from south of these directions, which suggests that the birds have a preferred southerly element in their winter movements. A complete break-down analysis of distance covered and direction of flight is given in Table II, which suggests that the majority of birds are either sedentary or disperse at random over short distances from their place of birth.

Two birds travelled into Yorkshire, 60 miles S., and 78 miles S.S.E., which are the greatest distances covered within the country. A third bird was recovered in Eire, 320 miles S.W. This was presumably a representative of the small migratory

TABLE II—DIRECTION OF FLIGHT AND DISTANCE COVERED BY WOODPIGEONS (*Columba palumbus*) RINGED AT BLAGDON, NORTHUMBERLAND, 1943-1952

Distance in miles	Direction																
	N.	NNE.	NE.	ENE.	E.	ESE.	SE.	SSE.	S.	SSW.	SW.	WSW.	W.	WNW.	NW.	NNW.	Total
0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9
1–5	2	—	1	—	5	—	1	—	—	2	2	—	1	—	—	1	15
5½–10	—	—	—	—	1	—	1	1	—	—	—	—	1	—	—	1	5
10½–15	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	2
15½–20	1	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	3
20½–25	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
40½–50	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
55½–60	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1
75½–80	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
320	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1
Total	3	—	1	—	6	—	3	5	1	3	4	—	2	—	—	2	39

element present in most species which normally do not undertake a regular seasonal migration. If the winter (November to March) recovery figures only are considered, it is seen that there are 12 of which 9 were south of Blagdon and 3 were not. Five of these 12 were juveniles under 12 months old, which again suggests southerly dispersal in the winter, involving many young birds.

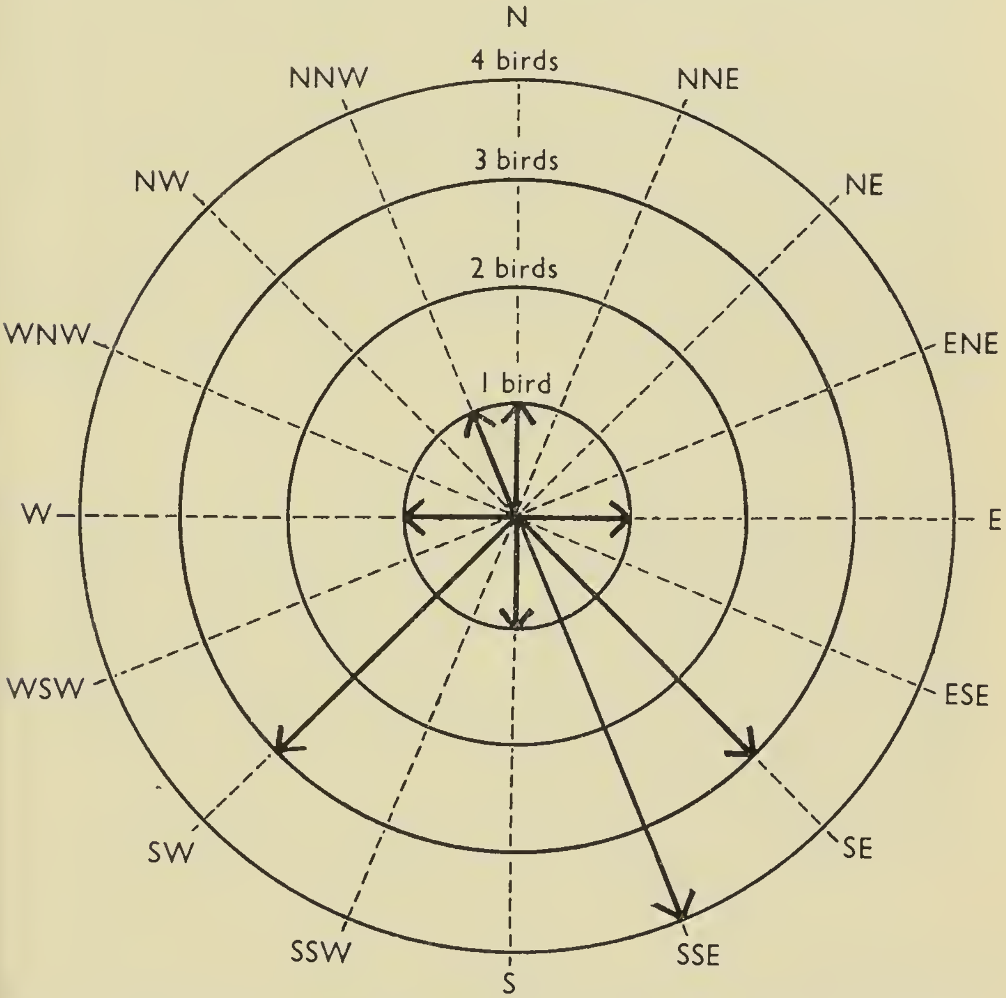

Fig. 1—Directions taken by Woodpigeons (*Columba palumbus*) ringed at Blagdon, Northumberland, 1943-1952

If substantial numbers of Woodpigeons from the North of England did migrate to southern England, it is considered likely that this fairly large sample of Northumberland-ringed nestlings would have provided some evidence of it. It is possible that birds breeding further north in Scotland may undergo larger movements, but the few ringing recoveries so far do not suggest this. The large-scale trapping and ringing of wintering adults in southern England would in time provide the answer to this problem. This species is one of the few shot extensively during the breeding-season, so that the return of rings from their breeding-quarters is likely to be relatively large.

In five cases both nestlings of a brood have been recovered. In the first example, one bird was shot 8 months later in December, 23 miles S.S.E., and the other 19 months later in November near where ringed. In the second, one bird was shot 7 months later in April, 9 miles S.S.E., and the other 15 months later in January, 14 miles S.W. In the third, one bird was shot 43 months later in April, 5½ miles W., and the other 95 months later in August at the ringing locality. In the fourth, one bird was killed by a cat soon after ringing, and the other was shot 70 months later in August whilst breeding, 4 miles S.W. In the fifth, one nestling was found dead soon after ringing, and the other shot 42 months later in September at the ringing locality.

The small number of recoveries of Blagdon-ringed Stock Doves suggests that their movements follow a similar pattern. Two ringed as nestlings were recovered where ringed (one in the nest), and a third was returned from 31 miles S.S.E.. An adult was shot 4 miles away due E.

AGE

The oldest Woodpigeon recovered so far was shot at its place of birth 95 months (7 years, 11 months) after being ringed as a nestling. From Table III it will be seen that 9 birds were recovered within their first six months, 9 between this time and one year, 7 in their second year, 1 in its third, 8 in their fourth, 3 in their fifth, 2 in their sixth, and one each in its seventh and eighth. The average time elapsing between ringing and recovery, based on 38 birds and omitting the three killed as nestlings, was 2 years 4 months (27.9 months).

TABLE III—TIME ELAPSING IN MONTHS BETWEEN RINGING AND RECOVERY OF WOODPIGEONS (*Columba palumbus*)

Months elapsing	0-6	7–12	13–24	25–36	37–48	49–60	61–72	73–84	85–96
No. recovered	9	9	7	1	8	3	2	1	1

The oldest of the four Stock Doves recovered was 3 years 7 months old. The average age was 13.3 months.

Further evidence is provided by the Blagdon birds in support of Colquhoun's (1951) suggestion that it is the juvenile birds which move the greatest distances; and also that all the more distant (at least 30 miles) recoveries occur in winter. The average age of 34 Woodpigeons recovered locally (excluding 3 young birds near or at the nest) is 29.1 months, whereas that of 4 distant recoveries is 16.5 months. Colquhoun's figures were 19 and 10.5 months respectively, and included some of the Blagdon data.

SURVIVAL

Table IV suggests that the fledging success of later broods is better than earlier ones. If the figures are grouped, of 70 nestlings ringed April-July, 10.0% have been subsequently recovered; whereas of the 187 ringed August-October, 16.6% have been recovered.

TABLE IV—SURVIVAL OF WOODPIGEONS (*Columba palumbus*) BASED ON MONTH OF RINGING

Month ringed	April	May	June	July	Aug.	Sept.	Oct.	Total
No. ringed	16	5	9	40	77	98	12	257
No. recovered	2	1	—	4	11	18	2	38

Of the 41 birds recovered, 35 (85.4%) were recorded as being shot; 4 were reported as being found dead (one dead and eaten in the nest). One was seen killed by a Sparrowhawk, and another found being eaten by a cat soon after ringing and close to its nest. The high recovery percentage (16.0) of the Blagdon Woodpigeons compared with the figure (4%) quoted by Colquhoun for 2,916 birds ringed during 1909-1942, is probably due to the intensified control of Woodpigeons by shooting, instigated by the Ministry of Agriculture during and since the war.

The largest number was shot in the period January-April, which is the time when birds are mostly killed flighting into roosts. Where roost-shooting occurs on game preserves this is normally not permissible until towards the end or after the close of the Pheasant (*Phasianus colchicus*) season. A second peak in August-September probably largely refers to birds shot over decoys at harvest time.

Summarising the cause of death of all recoveries of Blagdon Woodpigeons, we find that in January, 5 were shot and one found dead (5 locally, i.e. under 30 miles from place of ringing; and one distant, i.e. 30 miles or more from place of ringing); February, 8 shot (7 locally, one distant); March, 4 shot and one found dead (4 locally, one distant); April, 4 shot and one found dead (all locally); May, 2 shot and one killed by Sparrowhawk (all locally); August, 4 shot locally; September, 3 shot and one found dead (all locally); October, one nestling eaten by cat; November, 2 shot (one locally, one distant); December, 1 shot locally. Total, 33 shot, 4 found dead and 2 other causes (35 locally and 4 distant).

Of Stock Dove recoveries, one was found dead in the nest three weeks after ringing. The other three were shot. The lower recovery rate of this species is probably due to two main factors:—

(a) Different roosting behaviour. Many of this species roost (and probably die) in holes in trees and cliffs, and so are less frequently found dead.

(b) Stock Doves are smaller, faster and more agile fliers, presenting a smaller and more difficult target, and are thus shot in proportionately smaller numbers. This fact, combined with a different roosting behaviour, tends to lessen their chance of recovery.

DISCUSSION

The evidence obtained so far from the recovery of ringed Woodpigeons points to the view that the species is only a partial migrant within the British Isles. The summary of long-distance recoveries, combined with the data from birds ringed at Blagdon, and an examination of the recoveries recorded by the B.T.O. Ringing Scheme since Colquhoun's report, all suggest that Woodpigeons' and Stock Doves' movements are more in the manner of a random dispersal (with a southerly trend) than a true migration. Whether or not these birds return to their breeding-quarters has not yet been proved. Of particular interest is a series of four recoveries of nestlings ringed in Stirlingshire, Scotland, of which three travelled 60, 75 and 120 miles N.E., and a fourth 65 miles S.S.E.; negative evidence of a long passage to the south of England. It is also worth noting in this respect that no obvious hard-weather movements have been noticed in the Blagdon area, and in severe conditions many Woodpigeons die of a combination of cold and starvation.

Several authors (Beeston, 1931; Alexander, 1940; S.E. Bird Report, 1947; Wilkinson 1950; Colquhoun, 1951; Snow, 1953; Lack and Ridpath, 1955) give evidence of either southerly movements of Woodpigeons inland, or of the arrival of the species on the coast. The latter authors have shown, in the case of birds seen arriving on the South Coast, that these have already left the coast elsewhere and are merely returning after a short flight out to sea. This behaviour is probably an expression of latent migratory urge. There is further negative evidence of a trans-North Sea crossing in Owen (1953) who watched from a Lightship off the Thames Estuary for a fortnight in October and November, and recorded only one Stock Dove, flying west, in this time.

It is now suggested that the large flocks of Woodpigeons occurring in this country from late autumn onwards through the winter can easily be accounted for by the aggregation of smaller flocks of local breeding birds. The larger flights recorded inland at this time of the year have still to be accounted for, although it seems probable that they may consist of birds on local movement, or on feeding flights. Systematic observation on feeding flocks and roosting behaviour is very necessary to provide further information on this interesting phenomenon. The flight of Woodpigeons to roosts is known to vary considerably in height depending on the immediate meteorological conditions.

SUMMARY

1. The recoveries resulting from the ringing, in a Northumbrian locality, of 257 Woodpigeons (*Columba palumbus*) and 57 Stock Doves (*C. oenas*) are analysed.

2. 16.0% of the Woodpigeons and 7.5% of the nestling Stock Doves have so far been recovered.

3. Direction of recovery from place of birth tends to be random dispersal with a southerly bias.

4. Of the 35 Woodpigeon recoveries only four were over 30 miles from the ringing locality, and these all moved between S.E. and S.W.

5. The average time elapsing between ringing and recovery of Woodpigeons was 27.9 months.

6. There is some evidence that later broods survive better than earlier ones.

7. The majority of recorded birds are shot, and most of these are in late winter.

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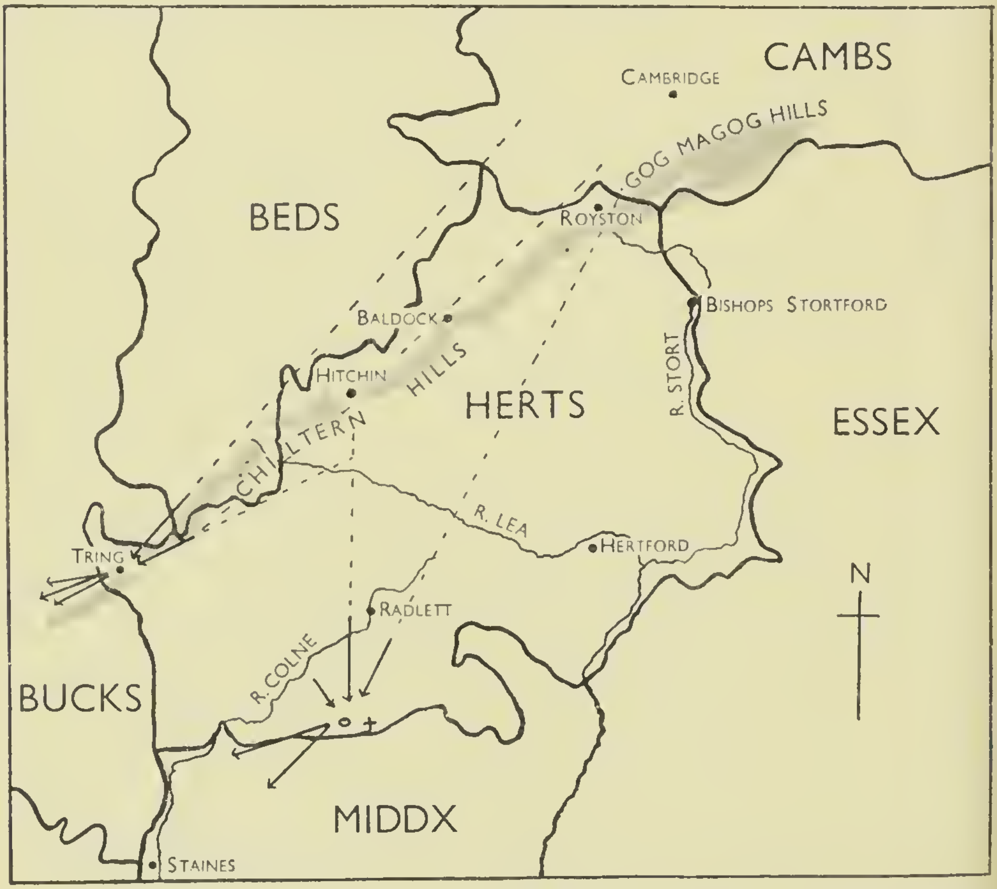
THE STATUS OF THE LESSER BLACK-BACKED GULL IN HERTFORDSHIRE

By Bryan L. Sage and A. B. Sheldon

The status of the Lesser Black-backed Gull (*Larus fuscus*) as a migrant in the British Isles has been dealt with in detail by Barnes (1953). Hertfordshire, however, had little or no mention in that paper, and the following information may therefore be regarded as supplementary to it. A perusal of the published Hertfordshire records of this species does not give a true picture of its actual status. It is, as the evidence we give will show, a regular and numerous passage-migrant through the county. Wintering has occurred in recent years and will also be dealt with. Map 1 shows the county of Hertfordshire in relation to its neighbours and gives the positions of the various localities mentioned in this discussion.



Map 1—To show flight-lines of Lesser Black-backed Gulls (*Larus fuscus*) noted in Hertfordshire

The arrows indicate observed lines of flight and the dashes are presumed ones. Hilfield Park and Aldenham Reservoirs, on the southern border of the county, are respectively marked by a circle and a cross. The map is not to scale.

MIGRATION

Spring and autumn movements of small numbers of Lesser

Black-backed Gulls have been recorded at the Tring Reservoirs for many years, the general direction being from S.W. to N.E. in spring and the reverse in autumn. The largest numbers recorded at Tring are 13 on 30th August 1908, 30-40 on 4th September 1910, 14 on 5th May 1912, 12 on 29th September 1942, and 29 on 9th April 1954. These are no doubt birds travelling between the Wash and the Thames Valley, or vice versa, as suggested by Rowberry (1933). In the autumn these birds would enter the county somewhere along the Herts./Cambs. border, probably west of Royston, and then follow the escarpment of the Chiltern Hills. The majority of these birds probably pass through the Hitchin Gap and continue in a southerly direction until they reach the Colne Valley. A minority certainly veer south-west after passing through the Hitchin Gap and follow the escarpment along its eastern flank until they reach the Tring Gap. They then drop down to the reservoirs, whence they continue across the Vale of Aylesbury. It is also fairly certain that a number of these birds, no doubt those which enter Hertfordshire well to the west on the Herts./Cambs/Beds. borders, follow the escarpment on its westward side and reach the reservoirs from the N.N.E. rather than the N.E. as do those birds which come through the Tring Gap.

Small numbers of birds have also been seen approaching Radlett and Hilfield Park Reservoir (see below) from the N.E. If these birds have been keeping a direct course, then they must have entered the county east of Royston, perhaps through the gap between the eastern extension of the Chiltern range and the Gog Magog Hills. The Lesser Black-backed Gull is rare in east Hertfordshire, and we have no evidence of even a small regular passage on that side of the county (down the Stort or Lea Valleys). An accurate estimation of the numbers of Lesser Black-backed Gulls that pass through the Tring Reservoirs during the spring or autumn passage has never, so far as we know, been made. Such a task would only be possible by regular daily counts at a fixed spot on the route, or at a favoured resting place—something which there does not appear to be in north or west Hertfordshire. In the extreme south of the county lies Aldenham Reservoir. This has always been a well watched spot, but there are only some half dozen records of Lesser Black-backed Gulls, from the reservoir, and with the exception of 8 birds referable to the Scandinavian race (*L. f. fuscus*) on 23rd November 1947, and 12 of the British race (*L. f. graellsii*) on 13th September 1952, all records refer to single birds or couples.

The Colne Valley has long been known as a migration route for various species of gulls, including Lesser Black-backs. Observations at Radlett in previous years have provided evidence of regular spring and autumn movements of gulls in a general N.E.-S.W. direction and vice versa. Gatherings of Lesser Black-backed Gulls have been recorded in previous years at some of the flooded gravel pits in the lower Colne Valley at Rickmansworth, e.g. in 1954 10 were seen at Maple Cross on 1st August and

90-100 on 26th September (K. R. Jones). At Springwell gravel pit flocks of 230-300 were seen on several dates between 18th September and 2nd October (*London Bird Report*, 1954, p. 27), and a flock of *ca.* 100 on 4th and 5th November (*antea*, vol. xlviii, p. 370). Until 1955 this was the only locality in Hertfordsire where such gatherings had been witnessed.

In 1952 the construction of a new 115-acre reservoir was commenced by the Colne Valley Water Company at Hilfield Park (see map), about half a mile due west of Aldenham Reservoir, and 2½ miles east of the Colne Valley. From 1st June to 30th October 1955 we were able to maintain an almost daily watch at the Hilfield Park Reservoir, and from the latter date until the end of the year visits were made at least once weekly. We found that it was being used as a regular resting-place by migrating Lesser Black-backed Gulls. Practically all the birds seen were of the British race, but birds referable to the Scandinavian race were seen as follows: 6th September, 2; 12th September, *ca.* 20; and 15th September, 4. A number of individuals with mantles of an intermediate shade were also seen during the peak of the passage. These facts suggest that not all of these birds were of British origin. The majority of the birds seen were adults, the number of juveniles being negligible. The first birds seen were a party of 3 on 12th June, followed by 14 on 18th June. Thereafter none was noted until July when small parties were recorded daily from the 1st to the 24th with a maximum of 13 on the latter date. On 26th, 27th and 28th July flocks of 40, 47 and 57 respectively were seen. Numbers in August never fell below 33, and the maximum numbers were counted between the 8th and 11th inclusive, the figures for these days being 121, 126, 160 and 139 respectively. The passage reached a peak during September with 308 on the 4th, 608 on the 12th, 160 on the 19th and 246 on the 20th. These numbers were maintained during early October, e.g. 223 on the 2nd, but fell off towards the end of that month, the highest number recorded between the 22nd and 29th being 85 on the 23rd. During November not more than 45 birds were seen at any one time, and considerably less than this at the end of the month. Only single birds or couples were seen in December.

All the figures quoted above were obtained during counts made in the evening, about two hours or so before dusk. Morning counts gave considerably smaller totals. This passage movement followed a regular pattern, with small parties arriving at the reservoir at intervals throughout the day from the north (main movement), north-east and north-west. The numbers approaching from the last direction were very small, and were probably birds coming from the Colne Valley between Radlett and Watford. The significance of birds arriving from the north-east was mentioned earlier. On arrival at the reservoir the birds would drop down to the water's edge to rest, and mostly remain there until the evening. Very infrequently a partly would circle the reservoir and then continue on a south-westerly course. Just before dusk all the gulls at the reservoir would depart *en masse* in a general south-westerly direction, a course which if maintained would take them down the Colne Valley to the vicinity of Staines. On no occasion were any Lesser Black-backed Gulls seen to roost at the reservoir. (Compare this with the results obtained by H. H. Davis at the new reservoir in the Chew Valley, Somerset, in 1954 (*antea*, vol. xlviii, p. 368-370).) The actual number of Lesser Black-backed Gulls *counted* by us at Hilfield Park between 1st June and 30th November was 5409, but the total number that passed through must have been considerably in excess of this figure. Most of the flocks approached the reservoir at heights between 100-250 feet.

From the evidence presented above it appears that the autumn passage commences in June and continues until late November. It should perhaps be mentioned that the scanty information available from previous years' observations, mainly at Radlett, suggests that the spring passage through Hertfordshire is on a smaller scale and follows a somewhat wandering course. We would suggest that the route along the Chiltern escarpment, through the Hitchin Gap and thence down the Colne Valley is the main one for birds of this species travelling between the Wash and the Thames Valley. The birds passing through the Tring Reservoirs are, we believe, as suggested earlier, those which have drifted too far westwards, or have deviated from the main course after crossing through the Hitchin Gap. The reason that the numbers involved in this passage have not previously been appreciated is due to the fact that (a) there has not before been a suitable concentration point in Hertfordshire, and (b) the flocks are generally small and pass at irregular, and often long intervals.

WINTERING

As is well known the wintering of this species in the British Isles is a fairly recent innovation which has been fully discussed by Barnes (1953). So far as Hertfordshire is concerned the habit apparently began in the early 1940's, and the numbers involved have never been great. The habit is practically confined to the lower Colne Valley at Rickmansworth, sample figures being 30 at Watford sewage farm on 13th February 1947, and 20 at Maple Cross on 3rd January 1954. Single birds have been seen at Tring in December, and the species is said to occur in small numbers in the Bishop's Stortford area in winter. It is evident that as far as Hertfordshire is concerned true wintering birds do not appear until early December or very late November. As usual some of these birds are referable to the Scandinavian race.

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PHOTOGRAPHIC STUDIES OF SOME LESS FAMILIAR BIRDS.

LXXII. GYR FALCON

Photographed by ARNOLD BENINGTON, F. S. R. CERELY
and J. H. SEARS

(Plates 37-43)

THE Gyr Falcon (*Falco rusticolus*) is a bird of wild open country, either rocky or mountainous, chiefly in the far north; it breeds across the Holarctic from Alaska and Canada to Greenland, Iceland, Norway and other parts of northern Scandinavia, through the northern parts of Siberia to Kamchatka and the Bering Straits, only in three places (Kamchatka, Alaska and Hudson Bay/ Labrador) nesting south of latitude 60°N. To Europe south of its breeding-quarters (including the British Isles) it is no more than a rather irregular straggler, but in America and the U.S.S.R. birds occur occasionally in winter as far south as 40°N. or 45°N. This population has been divided into 8 or 9 races, as much as anything on colour, which ranges from dark grey to almost white, but there is a lot of variation in most areas and the populations can be characterized only on the relative abundance of dark or light birds, so much so that it is often unsafe to attempt to decide upon the origin of winter-stragglers, even in the hand. Yet the colour extremes are very different. The birds of Labrador (*F. r. obsoletus*), for example, tend to be dark, as do those of the typical race in Scandinavia and the majority of those in northern Siberia (*intermedius*), but in eastern Siberia (*grebnitzkii*) and in Greenland (*candicans*) white birds predominate, to a marked extent in the latter country.

The birds of Iceland, where these photographs were all taken, are generally separated as *islandus,* which race tends to be paler and larger than the typical Gyrs, but not as white as the majority of the Greenland birds (birds from S. Greenland are indistinguishable from Icelands). It can be seen in plate 38 that the individual concerned has fairly broad pale tips and edges to the feathers of the upper-parts, while plate 40 shows that the under-parts are lightly marked with spots rather than bars, even on the flanks. The under-part markings of the species as a whole vary from noticeable barring, chiefly on the flanks, through spotting and what is little more than fine streaking, to pure white, while the feathers of the upper-parts have very narrow or almost absent pale edges in the typical race, which give way to broad edges and bases, so that only a dark centre remains, in the white populations. Juveniles (plates 42 and 43) are browner, and in the white populations darker, than the adults, with the under-parts broadly streaked with dark brown; Mr. Cerely's two fine photographs are, incidentally, taken from his book *The Gyr Falcon Adventure.*

Even the darker races of Gyr have only a trace of a moustachial streak (plates 38-40) compared with that of the Peregrine (*F. peregrinus*). The wings are shorter than in that species, coming to an end well before the tip of the tail when the bird is at rest (plate 38). In flight the silhouette is of a bird with a longer tail than the Peregrine's, and slightly shorter wings which are at the same time broader at the base and slightly rounder at the tips (because of the longer third and fourth primaries and the fact that the first few primaries are usually spread slightly more). Gyrs are, of course, larger and paler than Peregrines in flight, and the wing-beats are noticeably slower.

Plate 37 shows a typical nesting-area in N. Iceland and the actual site of the eyrie on a rocky buttress. The same site tends to be used year after year and thus it is usual for the rock below the nest to show up white from the birds' droppings (plate 37, lower); for the same reason it is common for there to be a considerable accumulation of food-remains in and around the breeding-ledge (plate 41, lower). The species is essentially a cliff-breeder in most areas (though in some parts of the range a few nest in trees), but the "cliffs", as here, are sometimes no more than 20-50 feet high. The eyrie (plates 38-41) is usually little more than a scrape on a ledge, like that of the Peregrine, and where there is a collection of sticks and grass this is the old nest of a Raven (*Corvus corax*) or Rough-legged Buzzard (*Buteo lagopus*) that has been taken over. As far as Arctic-nesters go, the Gyr Falcon breeds fairly early, mostly in late April and early May. Three, or more commonly four, eggs form the normal clutch and incubation, as with most falcons, lasts 28-29 days. The young appear to be in the nest about 6½-7 weeks: the period is given, for example, by V. C. Wynne-Edwards (*Auk,* vol. 69, p. 365) as 46-49 days (one nest, Baffin Island), and estimated by Y. Hagen (1952, *The Gyr Falcon in Dovre, Norway*) as 45 days (several nests).

One of the fuller studies of the Gyr Falcon is that of Yngvar Hagen (*op. cit.*), He gives an interesting list of prey, based on pellets and on the food-remains discovered at plucking-places and in the nest. The list includes 214 individuals of vertebrates and is made up of 6 species of bird and 3 species of mammal. No less than 95% of the total consisted of Ptarmigan (*Lagopus mutus*) and Willow Grouse (*L. lagopus*) — 205 individuals in all. All the birds were adults. Hagen emphasizes that his food-studies were made only in years when micro-rodents were numerous, yet in the mammal prey of the Gyrs he studied he was able to record only 2 Mountain Hares (*Lepus timidus*), 3 Lemmings (*Lemmus lemmus*) and 1 vole (*Microtus oeconomus*); 2 beetles were the sole invertebrate prey he found. Hagen reaches the conclusion that the Gyr is a specialist in *Lagopus* and that, because of this, it is able to settle on the high-fjell where grouse are the only food-supply for the large bird-eating raptors. Like the Peregrine, the Gyr takes its prey by a stoop or by direct pursuit and there are many tales of its prowess at catching birds which in different areas include many auks, waders, ducks, gulls and also small Passerines. On the other hand, in some parts of the range small mammals, particularly lemmings and hares, form a much greater proportion of the bird's diet; sometimes they are taken exclusively. For some reason, too, the Greenland Gyrs appear to be generally considered much less adept than other populations at catching birds; they seem to be comparatively slow and feed, chiefly by surprise, on lemmings, young ground-birds and small Passerines.

According to Hagen, the Gyr treats its bird-prey somewhat differently from the way the Peregrine does. While the latter usually leaves the wings unplucked, Hagen found that the Gyr Falcons in Dovre had, with only three exceptions, extracted all the wing-quills. That this is certainly not universal, however, is shown by plate 41 (lower). I. J. F.-L.

A NOTE ON FIELD-IDENTIFICATION OF PRATINCOLES

By P. J. Hayman

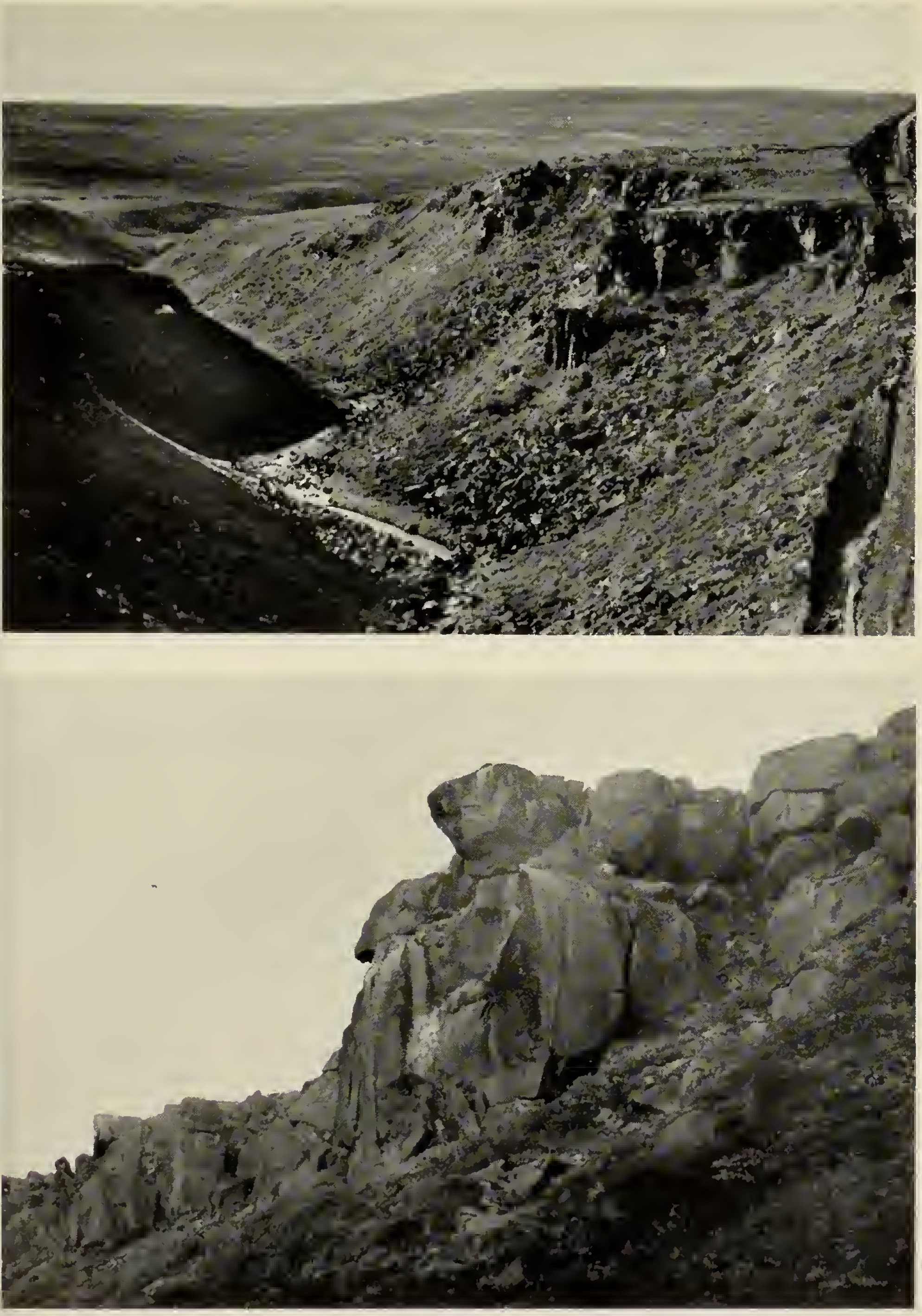
(Plate 44)

R. Meinertzhagen (*Birds of Arabia,* p. 474) has shown that specimens exist which are intermediate between the Pratincole (*Glareola p. pratincola*) and the Black-winged Pratincole (*Glareola nordmanni*). The latter bird which is dominant in S.E. Europe and S.W. Asia is considered to be a colour phase of *G. p. pratincola.* I have not seen any of these intermediate birds either in the hand or in the field and the following discussion refers to *typical* birds of both forms.

Most observers, when first seeing a pratincole, invariably look for the colour of the under wing-coverts, but these are often difficult to determine, especially in *G. p. pratincola* as the red colour becomes lost in the shadow of the wing. The pattern of the upper-parts is in fact a surer guide to specific identification in flight. Once aware of the differences between the two forms, I have had no trouble in separating them in the field. Features common to both forms in summer and winter, i.e. head-pattern, under-parts, rump and tail, black legs and the white shaft of the second primary, which have no direct bearing on identification, are omitted in the following notes.

Pratincole

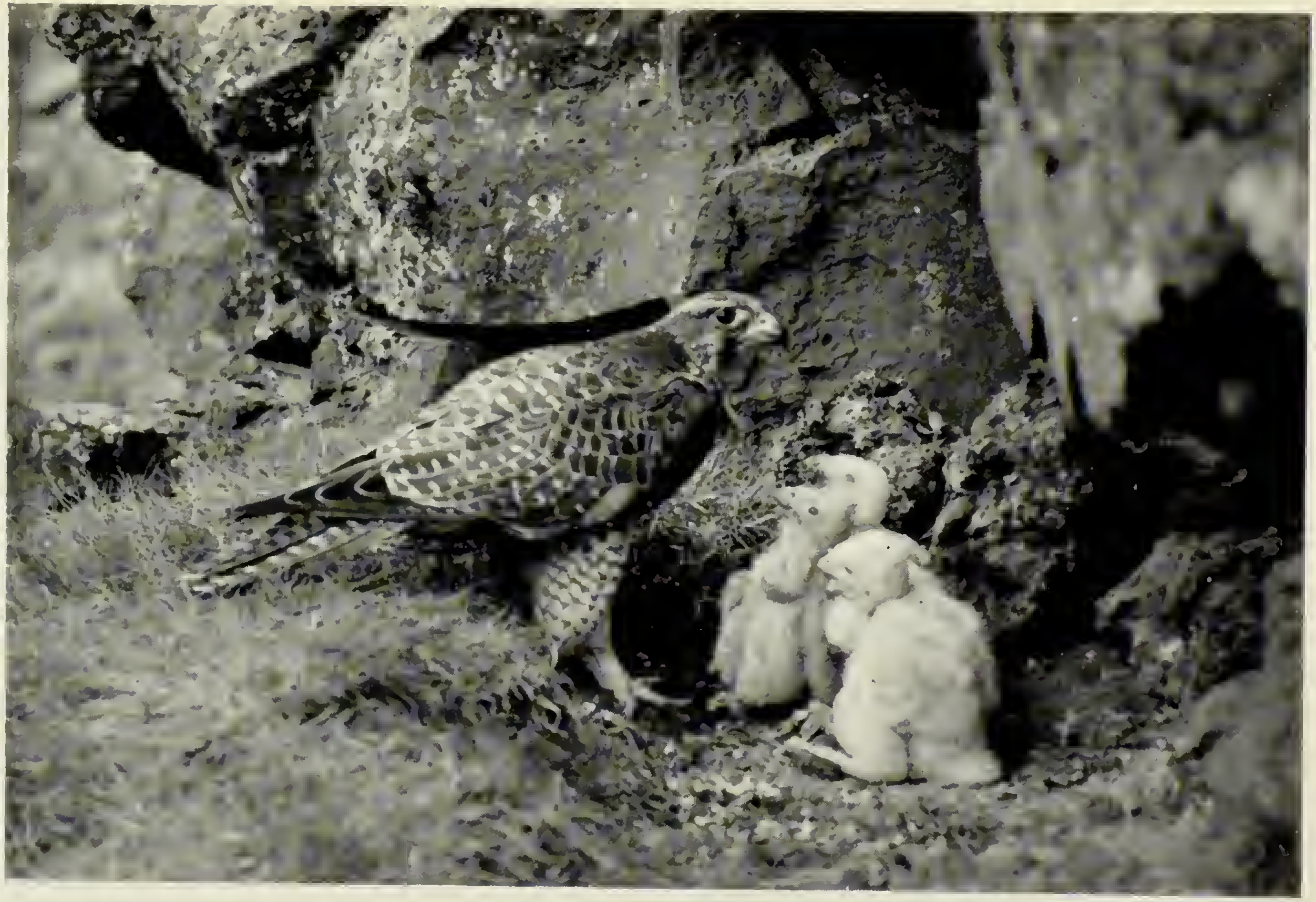
Upper-parts : In flight this form shows a strongly contrasting wing-pattern (drawing, plate 44), whereas the Black-winged form has almost uniform upper-parts. Inner primaries and outer



J. H. Sears

NESTING-SITE OF GYR FALCON (*Falco rusticolus*)
NORTH ICELAND: JUNE 1954

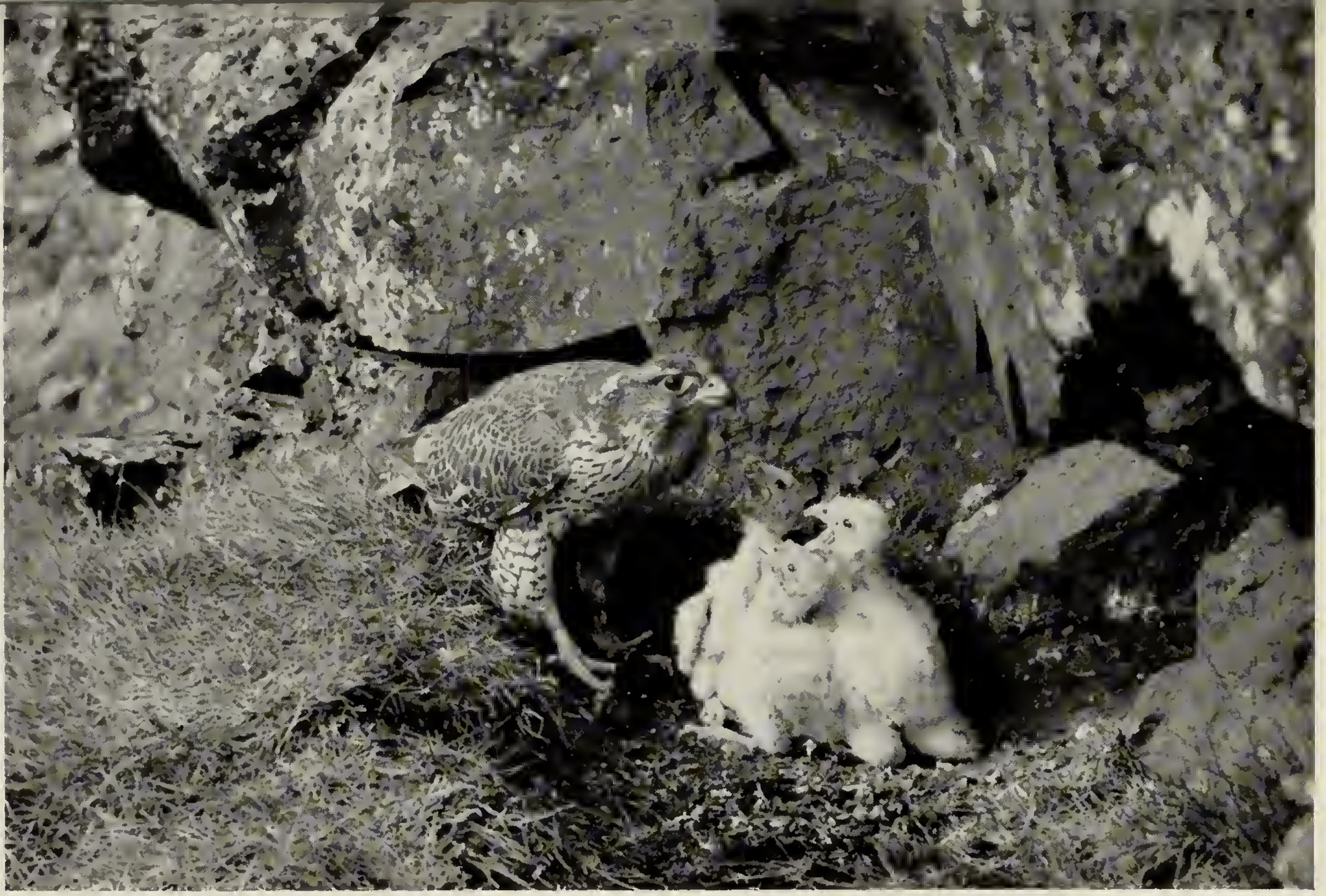
The upper photograph shows the view from above an eyrie—a commanding situation is usually a feature of it—while in the lower the white splashed rock marks the actual site: such an accumulation of droppings below the nest, and of food remains around it, is typical of many Gyr's eyries, particularly those which have been used for years (see page 311).



Arnold Benington

GYR FALCON (*Falco rusticolus*) WITH YOUNG: NORTH ICELAND, JUNE 1955

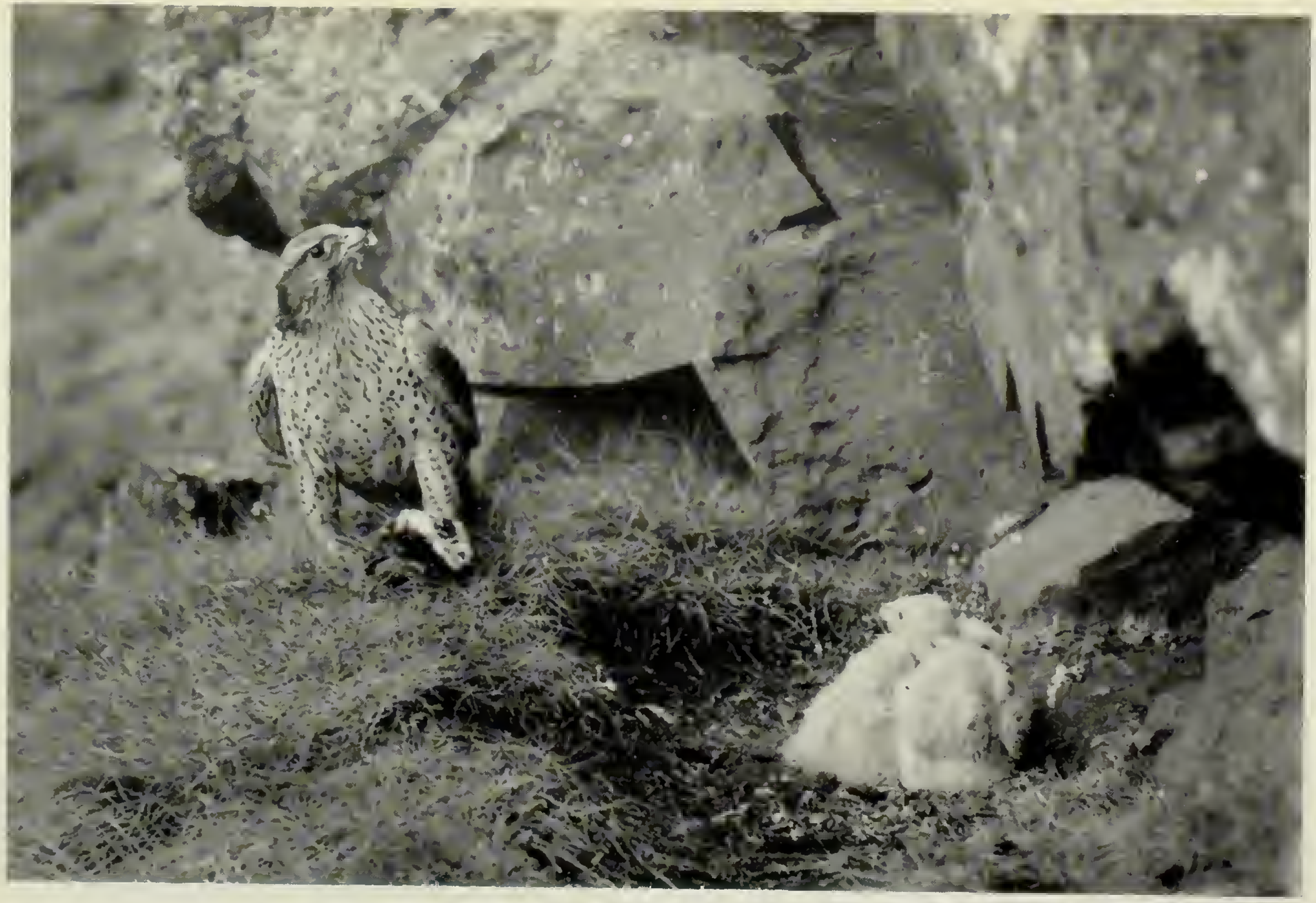
The eyrie is usually little more than a scrape on a ledge, though sometimes the disused stick-nests of other species are taken over. It can be seen here how the folded wings fall well short of the end of the tail, giving a slightly different silhouette from that of the longer-winged, shorter-tailed Peregrine (*F. peregrinus*), but the Gyr is in any case a larger and usually paler bird



Arnold Benington

Gyr Falcon (*Falco rusticolus*) with young: North Iceland, June 1955

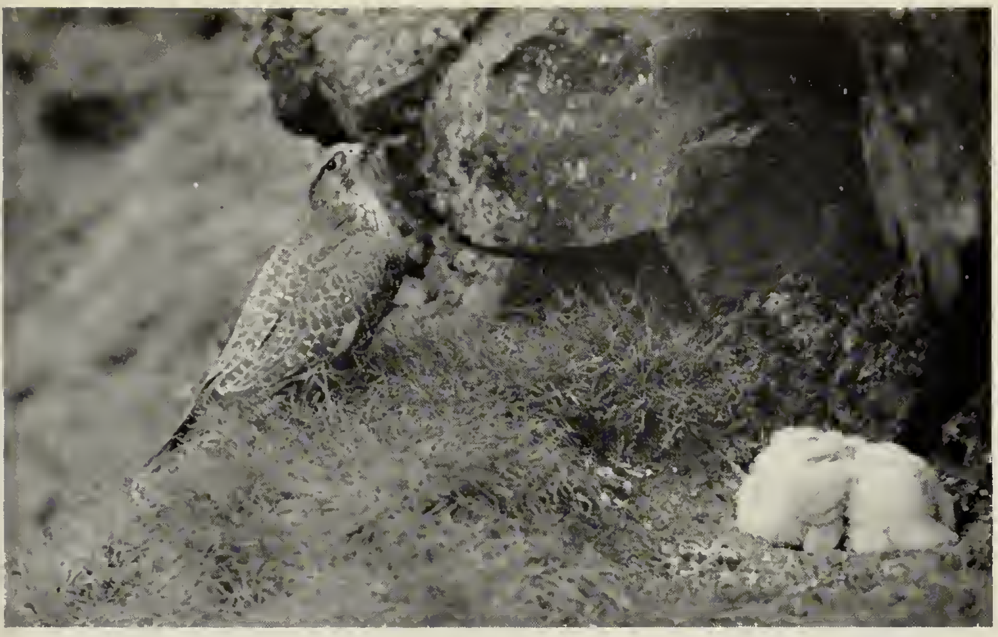
All the birds in these photographs are of the Iceland race (*F. r. islandus*) which in plumage comes part way between the dark population of Scandinavia (*F. r. rusticolus*) and the very white birds of Greenland (*F. r. candicans*). The pale edgings and markings on the feathers of the upper-parts and wings are often more pronounced than they are in the case of the bird shown here.



Arnold Benington

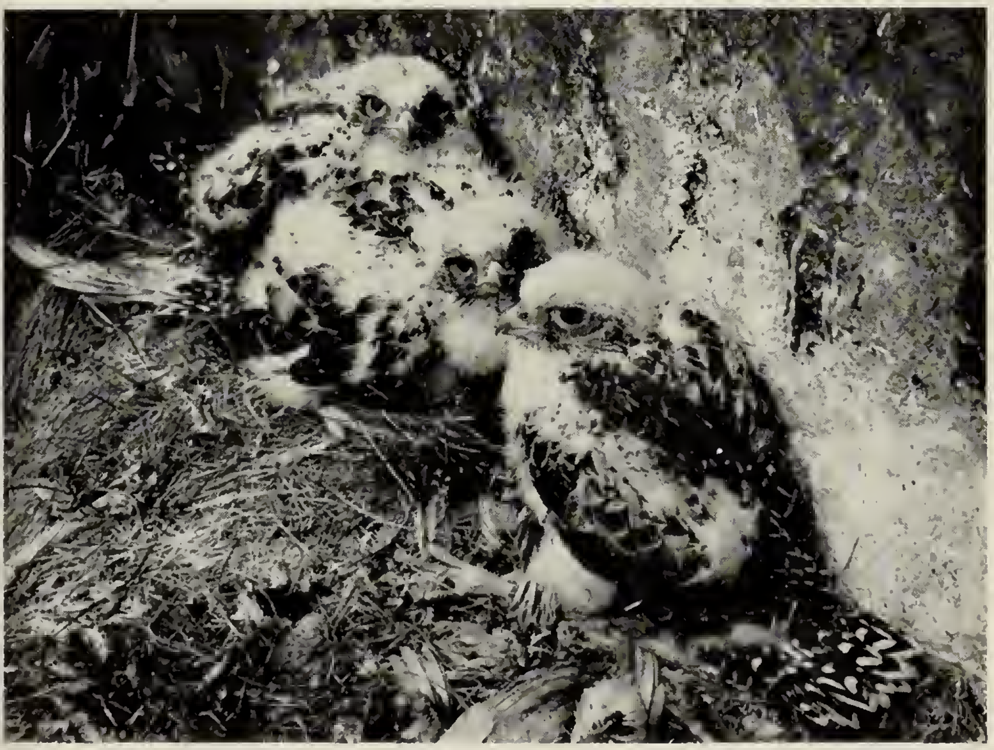
GYR FALCON (*Falco rusticolus*) WITH YOUNG: NORTH ICELAND, JUNE 1955

This shows well the comparatively lightly marked under-parts of the Iceland race (*F. r. islandus*), which are often characterized by spots and diamond-shaped blotches rather than bars. The Gyr's lack of a clearly defined moustachial stripe is also brought out well, but many individuals of the Iceland race often have a much whiter head than this bird has (see page 310).



Arnold Benington

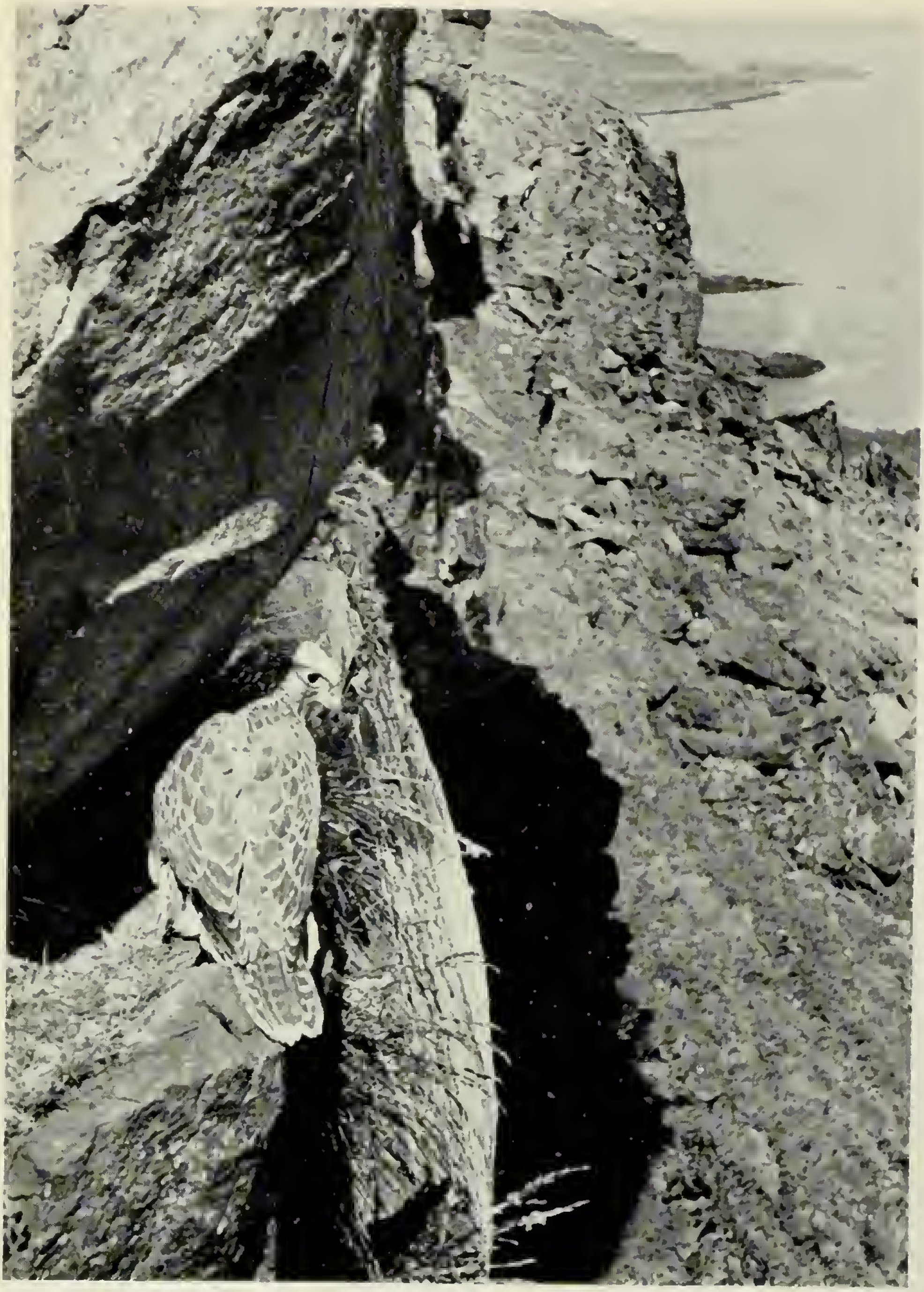
GYR FALCON (*Falco rusticolus*) WITH YOUNG
NORTH ICELAND: JUNE 1955



J. H. Sears

YOUNG GYR FALCONS (*Falco rusticolus*)
NORTH ICELAND: JUNE 1954

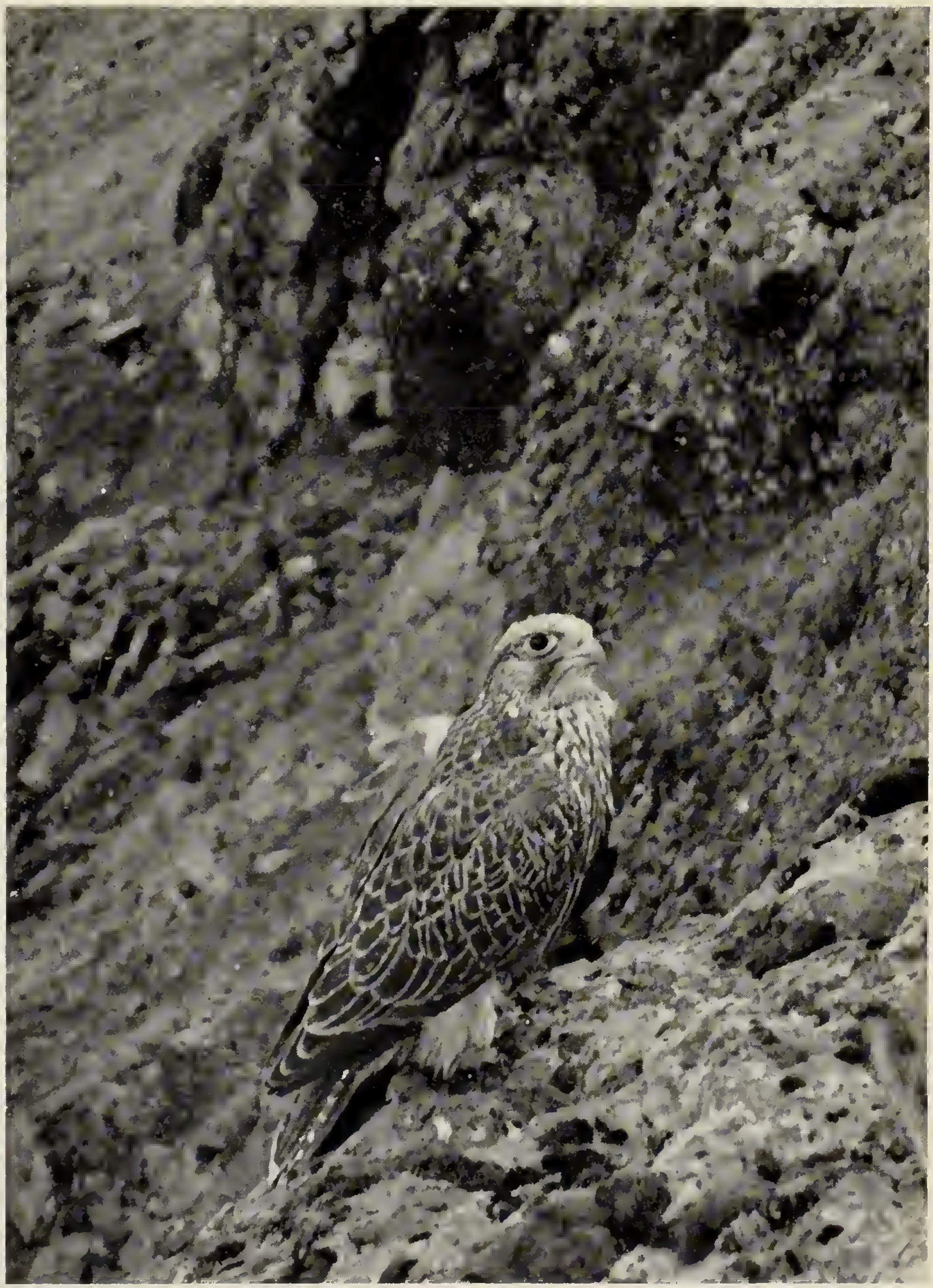
Three or four eggs are usually laid, so that three young make a normal brood. It can be seen here how the surrounds of the eyrie often become littered with the remains of prey, which sometimes accumulates from previous seasons (see page 311).



F. S. R. Cerely

JUVENILE GYR FALCON (*Falco rusticolus*)
NORTH-WEST ICELAND: JUNE 1952

This gives another example of the breeding-habitat—wild open country, either rocky or mountainous, inland or near the sea. True cliffs are used by Gyrs whenever possible, but often only rocky outcrops like that shown in plate 37 are available (see page 310). The bird shown here is only just out of the nest.

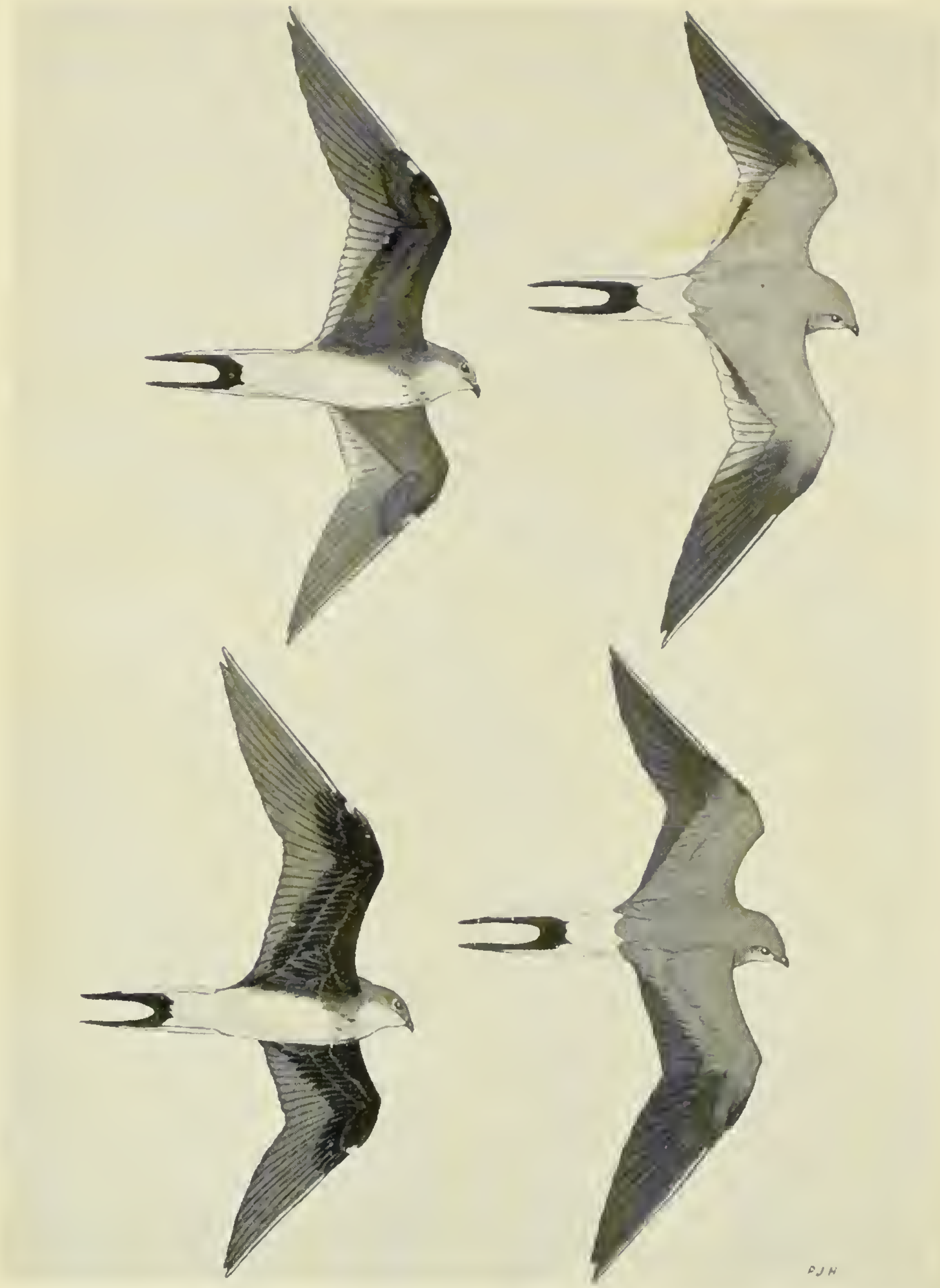


F. S. R. Cerely

JUVENILE GYR FALCON (*Falco rusticolus*)
NORTH-WEST ICELAND: JUNE 1952

Juveniles are browner, and in the white populations darker, than the adults, with the under-parts broadly streaked with dark brown. Those of the Iceland form (*F. r. islandus*), like this one, have whiter crown, nape and cheeks than those of the typical race, and the feathers of the rest of the upper-parts have more conspicuous white edgings.

PLATE 44



Drawn by P. J. Hayman

(*Upper*) PRATINCOLE (*Glareola pratincola*)
(*Lower*) BLACK-WINGED PRATINCOLE (*Glareola nordmanni*)

These sketches are designed to show that there are more striking differences in the field between typical specimens of the two species than the colour of the under-wing, which is often difficult to determine. The Pratincole has a strongly contrasting wing-pattern with pale inner primaries and secondaries, and a white trailing edge to the latter. The Black-winged has more uniformly dark upper-parts which contrast more with the rump, while the whole bird has a more black-and-white appearance (see page 312).

secondaries are pale, forming a break in the dark areas of the wing. All secondaries have a white trailing edge which is emphasized by being seen against the dark inner secondaries.

Under-parts : In flight, directly overhead, the under-sides of the wings look extremely dark, much more so than one would expect. If a bird is held in the hand and the wing viewed through half-closed eyes the red-brown colour of the axillaries and coverts will be seen to have almost the same tonal value as the grey-brown feathers surrounding it—hence the difficulty in picking out this feature in the field. Generally the red-brown under wing-coverts can only be picked out in the best light conditions, or especially when caught by a setting sun, when they are clearly visible over 300 yards away. [Also often on take-off.—P.A.D.H.].

The markings of the upper-parts are the best guide to this form (if the colour of the under wing-coverts is not visible) ; particular emphasis should be placed on the contrasting wing-pattern and, if it can be seen, the white trailing edge to the secondaries.

BLACK-WINGED PRATINCOLE

When I first saw birds of this form, I was surprised at their "black-and-white" appearance which is enhanced in dull weather.

Upper-parts : Upper-parts have a marked green tinge. At close range the darker primaries and secondaries show up fairly well against the rest of the wing, but this distinction is largely lost at longer range. There is no white trailing edge to the secondaries. The rump shows up very well and is much more obvious than in the Pratincole.

Under-parts : The black of the under wing-coverts is striking, especially in bright weather and can easily be seen at a reasonable range. But if an observer is not familiar with relative under-wing shades of the two forms, this feature as a sole means of identification (unless noted beyond reasonable doubt) should be used with caution.

Almost uniform upper-parts, jet black under wing-coverts, lack of a white trailing edge to the secondaries and pied appearance in the field distinguish this form from the Pratincole.

On 11th September 1954, I saw a mixed party of nine adult and juvenile birds (*G. nordmanni*), all in winter plumage, at Kabrit in the Suez Canal Zone. Most adults had streaked breasts and a few had marked pectoral bands; one bird showing a distinct pink suffusion below the pectoral band. The leg colour of some birds was noted as grey-black, but I have an entry in my field notebook which states that "legs look pale yellowish and trail as the birds take off". When approached, the birds stretched their wings above their backs for a few seconds and flicked their tails down suddenly when nervous.

Photographs of Pratincoles at the nest in the Camargue (France) have been published in *British Birds* (vol. xli, plates 47-51).

AUTUMN STARLING MOVEMENTS ON THE COAST OF S.E. IRELAND

By P. W. P. Browne

I spent the eight days from 30th October to 6th November 1954 on the S.E. coast of Co. Wexford, Ireland. Continuous watch for migrants was maintained from dawn till about 1300 hours G.M.T. The only species seen in large numbers was the Starling (*Sturnus vulgaris*), though also moving were Chaffinches (*Fringilla coelebs*), Skylarks (*Alauda arvensis*), Meadow Pipits (*Anthus pratensis*), and other species in very small numbers.

Table I shows the observation points, and also the weather, both locally and over the whole St. George's Channel area (data from localities listed at end). Places mentioned in this paper are shown on the map (Fig. 1).

Table I—Observation points, wind and weather details

Date	Observation point	Local wind	Average over St. George's Channel wind	Average over St. George's Channel weather
30 Oct.	At sea	W 4	W 4	bc
31 Oct.	Carnsore Point	W 4	SW 4	or-bcp
1 Nov.	Carnsore Point	E 2	ENE 3	bc
2 Nov.	Carnsore Point	NNW 2	ENE 2	bcm
3 Nov.	Carnsore Point	W 2	WNW 3	bc
4 Nov.	Greenore Point	W 3	W 3	bc
5 Nov.	Carnsore Point	NNE 3	NNE 3	or
6 Nov.	Carnsore Point	NNE 6	NNE 6	op

Notes: (i) Wind force on Beaufort scale.
(ii) Weather symbols as used by H.M. Meteorological Office.
(iii) On 30th October, I was on board S.S. "Alexandra", 5 to 10 miles off shore, between the Blackwater Light Vessel and Tuskar Rock.

On two days of the eight, 31st October and 5th November, no Starlings were seen. Both days were associated with periods of continuous rain in the early morning. Table II summarizes the movements observed on each of the other six days.

Table II—Details of observations on Starling (*Sturnus vulgaris*) movements by the author

Date	Total number	Hours after sunrise of peak	Average direction of flight	Average height
30 Oct.	297	2.6	W	low
1 Nov.	912	1.0	NW	high
2 Nov.	394	1.3	N	medium
3 Nov.	34	3.2	WNW	low
4 Nov.	236	2.3	W	medium
6 Nov.	578	3.4	N	low

Notes: (i) Average height—low: less than *ca.*50 feet above sea level.
high: only just visible with naked eye.
medium: between low and high.
(ii) Sunrise 0711 hours to 0721 hours G.M.T.

A pattern was revealed similar to that reported previously from the Irish coast near Dublin (*antea,* vol. xlvii, p. 348). After sunrise there was a variable period with no observed movement. When the first Starlings appeared, the majority quickly followed and, for a short time, comparatively large numbers were seen. This "peak" lasted 20 to 40 minutes. It was usually followed by a trickle of birds, at least for the rest of the morning.

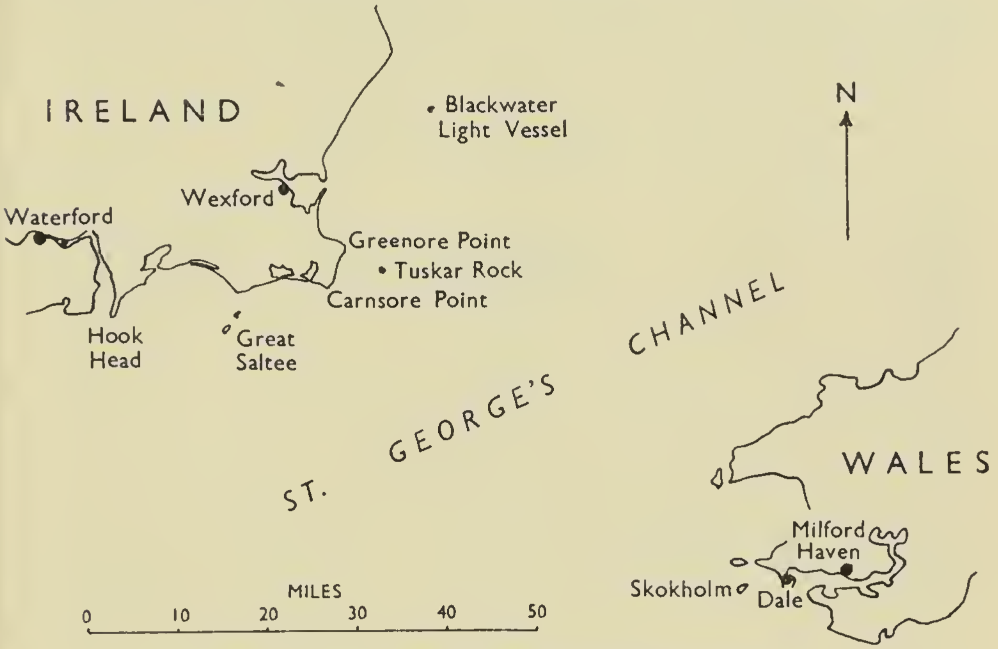


FIG. 1—LOCALITIES REFERRED TO IN THE TEXT

While observing a similar migration of Starlings at the Kentish Knock Light Vessel off the S.E. coast of England, D. F. Owen (*antea,* vol. xlvi, p. 355) was unable to detect any effect of the wind on the time of passage. However, there were no following winds during his period of observation. It can be seen from Tables I and II that time of arrival on 1st and 2nd November, with light winds blowing from Wales to Ireland, was an hour or two earlier than on 30th October, 3rd and 4th November, with winds in the opposite direction. The exceptional case of 6th November is discussed below. These results are what would be expected if Starlings departed from the Welsh coast about sunrise (shortest crossing 50 miles).

Direction of flight was consistent with supposition that they did so, though mainly into the wind when possible. Most flocks were fairly low. The main exception was on 1st November when Starlings arrived high with wind half following.

On 6th November conditions were very bad. It seems unlikely that Starlings could have crossed from Wales to Ireland. Yet the second largest number of Starlings of the whole autumn was recorded at Great Saltee Bird Observatory (R. F. Ruttledge and J. Weaving, *Bull Fair Isle B.Obs.*, vol. II, p. 276). Details of this and other movements at Great Saltee are given in Table III. At Carnsore Point (12 miles E.N.E. of Great Saltee), Starlings began to arrive from the south 35 to 40 minutes after the first at Great Saltee. Mr. J. Weaving has suggested (*in litt.*), and I agree, that those seen at Carnsore Point may well have come from Great Saltee to which, in turn, they may have flown from somewhere further west (*e.g.* Hook Head). Wind to the west of Saltee was less strong (force 4, N.W., at Tycor, Waterford).

TABLE III—DETAILS OF OBSERVATIONS ON STARLING (*Sturnus vulgaris*) MOVEMENTS AT GREAT SALTEE

Date	Total number	Direction	Time (G.M.T.)
1 Nov.	1	arrived from S	1250 hrs.
2 Nov.	123	departed NE, W	1100 hrs., 1620 hrs.
3 Nov.	10	departed NW	1420 hrs.
4 Nov.	0	——	——
5 Nov.	0	——	——
6 Nov.	*ca.* 1500	arrived from S-SW, departed NE	1000 hrs.-1500 hrs.

By comparing Tables II and III, it can be seen that, on two days (1st and 4th November), fairly large movements occurred at Carnsore Point and Greenore Point respectively, but little or nothing was recorded at Great Saltee. Such lack of agreement between points on the Irish coast only 12 to 15 miles apart makes less surprising the poor correlation in 1953 and 1954 between observed movements of Starlings and Chaffinches at the four Irish Sea Bird Observatories (P. Davis, *antea,* vol. xlvii, p. 419; Davis and Weaving, *antea,* vol. xlviii, p. 523).

This does not imply that the migration is necessarily on a narrow front. On 1st November the whole movement at Carnsore Point was over in 21 minutes. Because the majority of Starlings pass in a short time and sometimes fly high, it may be easy to miss them altogether at an Observatory where continuous watch is not practicable throughout the autumn.

I would like to acknowledge with thanks the comments on this paper of Major R. F. Ruttledge, Mr. J. Weaving and the Editors of *British Birds*. I would also like to thank the following for information supplied: R. F. R. and J. W. (data from Great Saltee Bird Observatory), Mr. P. Davis (weather data, Skokholm and Dale, Pembrokeshire), Commissioners of Irish Lights (wind data, Tuskar Rock and permission to travel on S.S. " Alexandra " on 30th October), H.M. Meteorological Office (wind data, Milford Haven, Pembrokeshire) and the Irish Meteorological Service (wind data, Tycor, Waterford).

FEMALE PIED WHEATEAR: THE PROBLEM OF IDENTIFICATION

By J. S. Ash
(*Game Research Station, Fordingbridge, Hants.*)
and K. B. Rooke

Difficulties encountered in identifying the third British example of the Pied Wheatear (*Oenanthe leucomela*), trapped at Portland Bill, Dorset, in October 1954 (Ash, 1955), suggest the need for some clarification of the distinguishing features of Palaearctic wheatears, and particularly of the specific characters of female *leucomela* in the field and in the hand. The differences in the English and scientific names used by various authors are liable to cause considerable confusion for anyone referring to the literature (see Appendix II). Field-descriptions of most of the female wheatears are scanty: a slight but misleading discrepancy in *The Handbook*, between accounts of field-characters and plumage of the female Pied Wheatear in autumn, was ultimately explained by finding that the first British specimen had been wrongly sexed (see below). Other reference books available at Portland (including Dresser, 1902; Ramsay, 1923; Peterson *et al.*, 1954) were insufficient for the certain exclusion of all other *Oenanthe* species which might conceivably occur as stragglers in Britain. It is hoped that this account may help anyone confronted with a similar problem in the future.

IDENTIFICATION

Provisional identification of the Portland bird as a female Pied Wheatear was later amply confirmed by comparing its description and measurements, also sketches and a few sample feathers, with published accounts and illustrations (including Whitaker, 1905; Meinertzhagen, 1930) and where necessary with skins (British Museum collection) of all 14 *Oenanthe* species of the Palaearctic and Oriental regions, listed by Wynne (1954).

Of the six species described in *The Handbook,* three (*oenanthe, isabellina, leucura*) were excluded by differences both in plumage and wing structure or measurements; *deserti* by plumage alone; leaving *leucomela* and *hispanica* for fuller consideration, particularly in the light of Witherby's comment that "rarely some females of Pied Wheatear are very difficult to distinguish from some females of *Oe. h. melanoleuca*", the Eastern Black-eared Wheatear (*The Handbook*, vol. II, p. 158). Reasons for excluding the remaining eight Palaearctic species are summarized in Appendix I, in which are included references to plates in the literature consulted.

Measurements and structure.

Portland bird:—Weight, 18.30 gm. (06.20 G.M.T., 19th

October). Bill from skull, 14 mm. Tarsi, 23 and 23.5 mm. (both approximate). For wing-characters, see Tables I and II.

TABLE I—WING-FORMULA: COMPARISON WITH PIED AND BLACK-EARED WHEATEARS (*Oe. leucomela* and *hispanica*)

Published data from *The Handbook* except as indicated by: (*V*)—Vaurie (1949); (*M*)—Meinertzhagen (1930); or (*C*)—Eagle Clarke (1916).
(*Note*: (+) longer; (−) shorter; (=) equal.)

Primaries (*measured in mm.*)	Portland bird (*both wings*)	*Oe. leucomela leucomela*	*Oe. hispanica melanoleuca*
1st relative to primary coverts	2(−)	3(+) to 3(−) (*V*) 6(+) to 3(−)*	5(+) to (=) (*V*) 8(+) to (=)†
Longest	3rd 4th, 0.5-1(−)	3rd & 4th	3rd & 4th
2nd shorter by	4	4-6	4-7
5th shorter by	4	1-4	1-3
6th shorter by	10	8-12	6-10
Relation of 2nd to 5th	2nd = 5th	(*M*) 2nd < 5th (*C*) 2nd = 5th§	(*M*) 2nd < 5th
Emarginated	3rd to 5th	3rd to 5th	3rd to 5th

* In 57 skins, 1-6 (+), av. 2.2; in 27, (=); in 20, 1-3 (−), av. 1.5.
† In 42 skins, 1-8 (+), av. 3.1; in 11, (=).
§ In the Orkney specimen (first winter female).

TABLE II—WING-LENGTH: COMPARISON WITH PIED AND BLACK-EARED WHEATEARS (*Oe. leucomela* and *hispanica*)

References as in Table I.

	Wing length (mm.)	Authority and Remarks
Portland bird	92	Both wings measured
Oe. l. leucomela ♀	87-95	*Handbook*
,, ,, ,, ♀ ad.	88-96 (av. 92.6)	(*V*) 15 specimens in fresh plumage
,, ,, ,, ♂♀	88-98	(*M*) Egypt
,, ,, ,, ♀ (1st w.)	92.5	(*C*) Orkney specimen
Oe. l. cypriaca ♂♀	82, 84-90	(*M*) Cyprus, etc.
,, ,, ,, ♂ ad.	83-90 (av. 86.4)	(*V*) 16 in worn plumage (Cyprus, spring)
Oe. hispanica ♀	85-90	(*H*) both races the same
Oe. h. melanoleuca ♀ ad.	85.5-95.0 (av. 89.5)	(*V*) 14 in worn plumage (Persia)
,, ,, ,, ♂♀	85-93	(*M*) 24 specimens, Egypt

The tables show a close agreement in wing-structure between the Portland bird and *Oe. l. leucomela*, and that it had a longer wing than the Cyprus race (*Oe. l. cypriaca*); also that it differed from most female *Oe. hispanica melanoleuca* in having a longer wing (with the odd exception of some from Persia cited by Vaurie, 1949), shorter 1st and 5th primaries, and 2nd=5th. Its 6th primary was at the centre of the range given for *l. leucomela*, but at the shortest extreme for *h. melanoleuca*. It showed no sign of incomplete wing-moult. Though not large, these differences seem diagnostic of *l. leucomela* as opposed to *h. melanoleuca*, quite apart from plumage characters.

Plumage.

Portland bird:—Certain points noted in the hand amplify the previous field description (Ash, *loc. cit.*). *Upper-parts*—crown to back, including scapulars, drab brownish-grey, rather greyer than in Meinertzhagen's Pl. XI, fig. 3, of ♀ *leucomela* (though it was found in the field that upper-parts looked greyer in some lights and browner in others); crown and nape slightly paler and greyer than rest; distinct pale creamy-buff fringes to feathers of mantle, back and scapulars (giving a scalloped or mottled effect). *Side of head*—pale buff supercilium above and behind eye, continued forwards as a barely perceptible pale line above light brownish-grey lores to indistinct pale patch on forehead; ear-coverts browner than crown, and slighty darker, but not as dark as in Meinertzhagen's Pl. XI, fig.3. *Under-parts*—chin and upper throat whitish-buff, tinged grey, only slightly paler in tone than pectoral band* (lower throat and upper breast), which was light tawny-brown (almost orange-buff in some lights) becoming darker greyish-brown towards flanks, into which it merged; lower breast and rest of under-parts creamy-white with a very faint warm buff tinge, fairly sharply demarcated from pectoral band; axillaries and under wing-coverts blackish-grey with brownish tips. *Rectrices*—extent of black (measured) very similar to that of *leucomela* figured by Meinertzhagen (Fig. 33, 5).

Comparison with Oe. l. leucomela *and* hispanica melanoleuca.

With only slight differences, indicated above, the Portland bird was very similar to Meinertzhagen's coloured figure (Pl. XI, fig.3) of ♀ *l. leucomela* (Kenya, 15th November 1915). Skins of ♀ *leucomela* in the British Museum resembled it closely, particularly one from India (30th August 1931) which was almost identical in colouring and well-marked pale fringes to feathers of upper-parts. Our account of the Portland bird also agrees very well with that by Eagle Clarke (1916) of the second British specimen (Orkney, 1st November 1916), obtained by Bain (1916)—probably both were first winter females. The Cyprus race (*l. cypriaca*) is less white, more sandy below, and darker brown above in winter than the typical form (*Handbook*, Meinertzhagen), to which the Portland example evidently belonged.

Ten skins of ♀ *hispanica melanoleuca* examined all had pectoral bands less distinctly demarcated than in the Portland bird. The one most nearly resembling it in general colour of upper-parts (Egypt, 8th November 1906) had only the faintest trace of pale tips to these feathers. The prominence of contrasting pale fringes on feathers of mantle, etc., in ♀ *l. leucomela* is the best character by which to distinguish it in the field or in the hand in unworn plumage from ♀ *h. melanoleuca,* in which they are virtually absent. In worn plumage when these pale tips are abraded, the two may be very difficult to distinguish, as pointed out in *The Handbook* and by Vaurie. Typically, ♀ *l. leucomela* are then more earth-brown (greyer)† above and have better demarcated pectoral bands (darker and richer) than ♀ *h. melanoleuca*, but are not always distinct in these respects.

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* Though distinct in colour, the pectoral band did not look much paler in tone than upper-parts in the field, presumably due to counter-shading.

SEX OF THE FIRST BRITISH SPECIMEN

As previously indicated, a reference in *The Handbook*, under field-characters of female Pied Wheatear in autumn, to the Isle of May example (19th October 1909) which appeared darker than a common Wheatear, was at first rather misleading. Subsequent reference to the original description and coloured plate of this specimen (Baxter and Rintoul, 1910), to Witherby's (1910) account of it, and the coloured plate in Thorburn (1925), strongly suggested that it was *not* a female, particularly because it had: "mantle black, each feather broadly margined with greyish-brown, lighter at the tips" (Baxter and Rintoul). Apart from wings and tail, there was no black on the upper-parts of the Portland bird, nor was there any in skins of female *leucomela* examined later, nor is it mentioned in detailed plumage descriptions (e.g. *Handbook*, Meinertzhagen). Our suspicions were later confirmed by Kenneth Williamson (*in litt.*), who kindly examined the mounted specimen in the Royal Scottish Museum and reported that it was undoubtedly a male, probably first winter.

ACKNOWLEDGEMENTS

Thanks are due to those who contributed to the description and trapping of the Portland bird; to W. B. Alexander and O. E. Wynne for the loan of several relevant items of literature; to J. D. Macdonald and Derek Goodwin for their help in arranging for us to examine skins in the British Museum; and to Kenneth Williamson for examining the Scottish specimens.

SUMMARY

Difficulties in identifying female Pied Wheatears (*Oe. l. leucomela*), and the features distinguishing them from other Palaearctic

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† In Meinertzhagen's key (1930, p. 262) the typical colours of upper-parts of ♀ *leucomela* and ♀ *hispanica* are attributed to the wrong species in each case (*cf.* his Pls. X and XI, and text).

wheatears are discussed in relation to the occurrence of the third British example of the species, at Portland Bill, 17th-19th October 1954. The first British specimen is shown to have been a male, not a female, as was previously thought.

Reference is also made in an appendix to the confusion in the English names of the various species discussed.

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APPENDIX I: DISTINCTION OF PIED WHEATEAR (*Oenanthe leucomela*) FROM PALAEARCTIC WHEATEARS NOT ON THE BRITISH LIST

The eight species of Palaearctic wheatears not on the British List were excluded owing to differences from the Portland bird (=*Oe. l. leucomela* ♀) summarized below. English and scientific names listed are those used by Wynne (1954); names used by some other authors are mentioned in Appendix II. The length of the first primary relative to the primary coverts is indicated as in Table I (*q.v.*).

Meinertzhagen (1930) and Vaurie (1949) each give very useful keys and tables of wing formulae of 12 species of Palaearctic wheatears, and should be consulted for other information. Together these cover all 14 species, Meinertzhagen excluding *picata* and *alboniger*, and Vaurie excluding *leucura* and *moesta*.

Red-tailed Wheatear (*Oe. xanthoprymna*).—Distinctive plumage (see Meinertzhagen: Pl. XII (♂), text pp. 276-7). 1st primary longer: 4-9 mm. (+) (Meinertzhagen); 1-8 mm. (+), av. 4.0 mm. (Vaurie).

FINSCH'S CHAT (*Oe. finschii*).—Upper-parts of ♀ too pale sandy-grey and pectoral band absent (skins, and see also Meinertzhagen: Pl. XI (♀)). 1st primary longer: 4-7 mm. (+) (Meinertzhagen); 1-7 mm. (+), av. 4.0 (Vaurie). 6th slightly emarginated in 80% (Vaurie).

WHITE-UNDER-WINGED CHAT (*Oe. lugens*).—♀ *l. halophila* has much paler sandy-grey upper-parts and mainly whitish under-parts lacking pectoral band (skins; see also Whitaker Pl. p. 48, ♂♀, and Vaurie pp. 29 and 32). Plumage of other races distinctive, ♀ like ♂ (see Meinertzhagen: Pl. XII, ♂). 1st primary longer: 1-5 mm. (+) in Meinertzhagen; 1-6 mm. (+), av. 4.0 mm. in Vaurie.

PIED CHAT (*Oe. picata*).—1st primary longer: 3-8 mm. (+), av. 5.4 mm.; 2nd shorter than 6th, and latter slightly emarginated in 94% (Vaurie).

HOODED CHAT (*Oe. monacha*).—Plumage distinctive, ♀ lacks white rump (Meinertzhagen: Pl. XII, ♂♀); also longer wing (100-107 mm.); 1st primary longer: 1-4 mm. (+).

HUME'S WHEATEAR (*Oe. alboniger*).—Black and white plumage distinctive, ♀ like ♂ (Dresser). Longer wing (♂, 100-107; ♀, 95-104); 1st primary longer: 4-10 mm. (+), av. 6.7; 6th slightly emarginated in 48% (Vaurie).

WHITE-RUMPED WHEATEAR (*Oe. leucopyga*).—Black or blackish plumage distinctive, sexes alike (Meinertzhagen: Pl. X). 1st primary: 6-12 mm. (+) in Meinertzhagen; 2-9 mm. (+), av. 5.5, in Vaurie. 6th slightly emarginated in 56% (Vaurie).

MOURNING WHEATEAR (*Oe. moesta*).—Lacks white in tail; rump and tail often rufous in both sexes (see Whitaker: Pl. p. 42, ♂♀; Meinertzhagen: Pl. XII, ♂). 1st primary longer: 4-9 mm. (+); 6th emarginated (Meinertzhagen).

APPENDIX II: NOTES ON THE SYNONYMY OF THE PIED WHEATEAR (*Oenanthe leucomela*) AND SOME OTHER PALAEARCTIC WHEATEARS NOT DESCRIBED IN *The Handbook*

PIED WHEATEAR (*Oe. l. leucomela*) in *Handbook*="Siberian Chot" (*sic*) in Ticehurst (1926)="Eastern Pied Wheatear", *Saxicola morio* in Dresser (1902) ="Pied or Pleschanka's Chat", *Oe. pleschanka* in Meinertzhagen (1930)= "Pied Chat", *Oe. leucomela* in Baker (1924). (*Cf.* also *lugens* and *picata*).

RED-TAILED WHEATEAR (*Oe. xanthoprymna*)="Red-tailed Chat" in Baker and in Meinertzhagen="Red-rumped Wheatear" in Dresser (*cf.* also *moesta*). Subsp. *x.chrysopygia*=" Red-tailed Wheatear" in Dresser and Ticehurst.

FINSCH'S CHAT (*Oe. finschii*)="Arabian Chat" in Meinertzhagen="Arabian Wheatear " in Dresser. Subsp. *f. barnesi*=" Barnes' Chat " in Baker and in Ticehurst.

WHITE-UNDER-WINGED CHAT (*Oe. lugens*)="Mourning Chat" in Meinertzhagen (*cf. moesta*)="Pied Wheatear" in Dresser (*cf. leucomela*). Subsp. *l. halophila*="Western Pied Chat" in Whitaker (*cf. picata* and *leucomela*).

PIED CHAT (*Oe. picata*)="Indian Pied Wheatear" in Dresser="Pied Chat" in Baker and Ticehurst. *Oe. capistrata* and *opistholeuca* are now regarded as colour phases (Vaurie, 1949), respectively named "White-headed Wheatear" and "Strickland's Wheatear" in Dresser, and "Gould's Chat" and "Strickland's Chat" in Ticehurst.

HOODED CHAT (*Oe. monacha*)="Hooded Wheatear" in Dresser="Hooded Chat" in Baker and in Ticehurst.

HUME'S WHEATEAR (*Oe. alboniger*)="Black and White Wheatear", *Saxicola albinigra* Hume 1873, in Dresser="Hume's Chat" in Baker and in Ticehurst.

WHITE-RUMPED WHEATEAR (*Oe. leucopyga*)="White-rumped Black Wheatear" in Peterson *et al.* (1954)="White-rumped Black Chat" in Meinertzhagen ="White-rumped Chat" in Whitaker.

MOURNING CHAT (*Oe. moesta*) (*cf. lugens*)="Red-rumped Chat" in Meinertzhagen (*cf. xanthoprymna*)="Tristram's Chat" in Whitaker.

NOTES

Song-flight of Wood Sandpiper on passage.—In the Wood Sandpiper (*Tringa glareola*) song-flight on passage may sometimes be observed in places which are frequented by groups of them for days and even for weeks. Such a place is the Ismaninger Teichgebiet, 9 miles east of Munich, Germany. Here, on 11th May 1939 I saw a party of Wood Sandpipers flying in pairs over a swampy area in exactly the same manner as that described by G. H. Rees (*antea,* vol. xlviii, p. 415). Their song-flight reminded me very much of that of the Redshank (*T. totanus*). In May 1939 display-flights were repeatedly watched by several observers. W. Wüst (*Anz. Orn. Ges. Bayern,* vol. iv, p. 236), reporting on the birds of this area, writes that the song-flight of this species is more often seen than that of the Greenshank (*T. nebularia*) or the Spotted Redshank (*T. erythropus*). In some years a number of Wood Sandpipers remain in the Ismaning area throughout the summer, but they never make any attempt to breed there. G. Diesselhorst

Song-flight of Green Sandpiper on passage.—The 8th of October 1955 was at Cambridge a day remarkable for stillness and warmth after the S.W gales of the three previous days. I spent the afternoon on the Cambridge Sewage Farm, and from 14.50 to 15.05 hours G.M.T. I was able to watch and listen to a Green Sandpiper (*Tringa ochropus*) in song-flight over the gravel-pits near-by.

The first phrases may have been given from the ground (the bird being at the outset hidden from me by a hedge) but the remainder were uttered in the air in an erratic and undulating flight at about sixty feet. The series consisted mainly of a phrase approximating to "weet-weet-klooi-klooi-eet-eet" with a strong final accent. Other shorter phrases included a "kit-klu-ee-tit" and a "kit-klu-aa-eet". I am sure the performance was completely natural, the bird being unaware of my presence. The general effect was melodious and impressive. D. I. M. Wallace

[Green Sandpipers on passage not infrequently produce snatches of song, but it seems rare for this to be sustained for any length of time and the bird watched by Mr. Wallace was in full flight for 15 minutes. From the remarks made above by Dr. Diesselhorst it seems likely that display-flights while on passage are no more uncommon in the Wood Sandpiper than they are in the Green (see also *antea,* vol. xlviii, pp. 315-316 and vol. xlix, p. 39).—Eds.]

Marsh Sandpiper in Northumberland. — From 20th to 25th August 1955, on a flooded colliery subsidence known as Wallsend Swallow, about two miles north of Wallsend in the Tyne Valley, a small, slim, pale wader was seen by M. B. On the 24th he showed it to A. F. and J. F. who, being unable to identify it, wrote out a detailed description and made a sketch on the spot. Dr. H. M. S. Blair was consulted and suggested that the bird might be a Marsh Sandpiper (*Tringa stagnatilis*) and so it proved to be. On 29th August it was seen by B. L. under excellent conditions at a distance of *ca.* 15 yards. In general it resembled a very small Greenshank (*T. nebularia*); but, as two Greenshanks were present on the marsh at the same time, it was easy to compare the two species and note the points of difference. The Marsh Sandpiper was distinctly smaller and slimmer, its stance when feeding was more horizontal, its movements much more rapid. The bill was very dark, slender and needle-like and, proportionately, not so long as that of a Greenshank. The legs were very dark (not green), long in proportion to its body and extending *ca.* 1½-2 inches beyond the tail in flight. The head appeared greyish, as it was flecked with brown, like the back of the neck, but the forehead was distinctly white. In flight a large area of white was shown on the rump and tail and only the central tail-feathers were lightly flecked with brown. The breast and under-parts were very pure white. It did not associate with the Greenshanks, though it frequently passed close to them, when its smaller size, nimbler actions and more rapid gait were very noticeable. It did not rise with the Greenshanks and appeared to be less easily alarmed; but, when flushed, it flew low, calling as it did so. On the ground its note was—"tu-lee, tu-lee"; in the air a series of notes—"tu-lee, tu-tu-tu-tu, tu-u-lee, tu-tu-tu". It was not seen after 29th August. This is the first record of this species for Northumberland.

MICHAEL BELL, ALAN FRIZZELL, JOSEPH FRIZZELL and BRIAN LITTLE

Bonaparte's Gull in Northumberland.—On 11th July 1955, at Seaton Sluice Point, 4 miles north of Tynemouth, Northumberland, a small gull was seen beating up and down the coast at about 50 to 100 yards off shore, where it was feeding with large numbers of adult and juvenile Black-headed Gulls (*Larus ridibundus*), Common Gulls (*L. canus*) and Kittiwakes (*Rissa tridactyla*). It was quite noticeably smaller than the other gulls in its company; but not so small as a Little Gull (*L. minutus*) seen there a few weeks previously. The head, nape, neck, under-parts and under-wings were pure white. There was a conspicuous and quite large dark smudge behind the eye. The mantle was like that of a Black-headed Gull, but the inner wing had very fine bars crossing to the carpal joints, as in the juvenile Kittiwakes; but not so conspicuous or broad as in the latter. The wings were more pointed and longer than those of a Little Gull. The primaries showed black when the bird was at rest on the water, but when it alighted on the sea, as it did to feed, the wings were brought up high above the head and the primaries were fanned, so that their pattern could be clearly seen, showing pure white primaries with black leading edges. The tail was pure white, slightly rounded at the tip with a very narrow terminal band, much narrower than that of a juvenile Black-head or Kittiwake. This band was broken slightly by one or two white feathers in the centre. The bill was small, much smaller than that of a Black-head and completely black. The legs were dark, the exact colour being indistinguishable. The bird's flight was a very conspicuous character, being much more like that of a tern than a gull. The wing-beats were noticeably faster than those of a Black-head. It sometimes hovered, then neatly side-slipped on to the water to pick up food, rising again immediately with rapid wing-beats in the manner of a Black Tern (*Chlidonias niger*). Its usual height above the sea was from 15 to 20 feet; but once it was seen to dive like a Common Tern (*Sterna hirundo*) from *ca.* 5 feet. On the water it was buoyant; in this respect resembling a phalarope (*Phalaropus* sp.). It was under observation for two hours (19.20 to 21.20), but was not seen subsequently. I have no doubt that this was a Bonaparte's Gull (*L. philadelphia*) assuming its first adult plumage. BRIAN LITTLE

Black-bellied Dipper in Kent. — A Black-bellied Dipper (*Cinclus c. cinclus*) was first identified at Sandwich, Kent, on 20th November 1955, and it was seen thereafter many times until 6th December. I was shown the bird on 20th November by G. Dunkling and J. Websper just after they had first found it. I was later able to watch it for some hours and at very close range. A full description has been sent with this note and it is sufficient to say here that the throat and upper breast were white with no indication of immaturity, while the black of the belly lightening into the grey of the flanks was clearly seen. The bill was black and the legs were noted as light slate-grey or pinkish-grey.

The bird was very tame, allowing me sometimes to approach to within 5 yards. The area where it was found was one of small streams bordered by sedges and reeds and adjacent to a flooded rubbish-tip. The bird perched mainly over the water or on the banks, but once it remained in a tree some 20 feet up for about 5 minutes. It was seen to take pond snails (*Planorbis* sp.) and freshwater shrimps (*Gammarus pulex*). The former it opened in the manner of a Song Thrush (*Turdus philomelos*), smashing the shell before swallowing the snail. It fed from its perch by dipping, fed as it swam, and obtained food below water, but at no time did I see it completely submerged. DENNIS F. HARLE

Red-spotted Bluethroat on Skokholm. — A first-winter male Red-spotted Bluethroat (*Cyanosylvia s. svecica*) was caught in the Heligoland trap on Skokholm in the early afternoon of 10th October 1955. The red spot was already well defined, though some feathers carried buff tips. The blue was confined to the gorget, the chin and sides of throat being buff spotted with black. Its weight was 25.2 gm. This is the second record of the species in Wales, and the first of the Red-spotted form. A White-spotted Bluethroat (*C. s. cyanecula*) was seen on Skomer by S. Marchant on 1st May 1946. PETER DAVIS

Savi's Warbler in Cambridgeshire. — On 2nd June 1954, at 18.00 hours F. M. B. heard what appeared to be an unusual Grasshopper Warbler (*Locustella naevia*) at Wicken Fen, Cambridgeshire. The reeling was in unexpectedly short bursts and lower in pitch than normal. Time running short, further investigation had to wait. On 5th June at 08.00 hours, F. M. B., D. M. Griffin and C. D. T. Minton revisited Wicken to try to see the bird. It was soon located, singing, within 50 yards of where it was first heard, with the same short bursts of reeling, on the edge of a willow bush. It was observed for only about 1½ minutes, but in good light at 25-30 yards range and was at once seen not to be a Grasshopper Warbler by the rufous brown colour of the back and lack of streaking. These factors together with such short bursts of reeling indicated a Savi's Warbler (*L. luscinioides*). It then vanished and, although heard again, only fleeting views were obtained later.

On 8th June (11.00 hours) the bird was again well seen at 50 yards by I. C. T. Nisbet, M. J. M. Larkin and F. M. B. As before, its song indicated its whereabouts. On 13th July (evening) an unusually close approach (3-6 yards) was allowed and a detailed inspection was possible (D. M. G. and Miss W. M. Irving). The bird was seen and heard on several other occasions until the middle of August by various observers—including E. M. Nicholson, who has had experience of the species abroad—but it was neither seen nor heard in the summer of 1955.

The bird's song was one of its characteristic features and consisted of short bursts of reeling, generally agreed to be lower in pitch than the reeling of Grasshopper Warblers near-by. E. M. N. and Dr. W. H. Thorpe compared recordings of this with recordings of Grasshopper Warblers and found some significant differences. D.M.G. heard a Grasshopper Warbler singing, shortly after hearing the Savi's Warbler, and noted the following differences from the latter: (1) higher in pitch; (2) much longer bursts—maximum 50 sec., minimum 15 sec., and average 30 sec.; this compares with average bursts of reeling of 6-8 sec. (timed by several observers) of the Savi's Warbler; (3) faster vibrations; (4) more mechanical and less musical.

The Savi's Warbler had a preference for singing from a small group of willows—in particular one bush where it generally sat in an exposed position, in an upright attitude with its tail depressed to an almost vertical position, and the whole body shivering. The head also turned from side to side and the bright yellow gape became plainly visible. Only once was it seen more than 50 yards (when 200 yards) from the favourite bush. The cessation of singing heralded a disappearance from view.

Most observers agreed that the Savi's Warbler was larger than the Grasshopper Warblers, appearing rather thickly built by comparison. I. C. T. N. noted it as being larger especially at the hind end, which gave it a decidedly pear-shaped appearance. Detailed description:—Forehead, crown and nape—brown, lightly tinged rufous, completely unstreaked. Ear-coverts—light brown. Superciliaries—a very indistinct streak, of a lighter brown, from the eye backwards. Back and mantle—brown with a rufous tinge (less than on head), unstreaked. Rump—rather reddish brown. Tail—relatively long and broad, rounded elliptically at the end; brown (shade not agreed). Wings—brown but with marked rufous suffusion on primaries; on close examination, very fine dark streaks were visible, mainly on primaries and wing-coverts. The streaking, which was rather inconspicuous, seemed to be formed by thin, dark edgings to the feathers. Throat—conspicuously white or grey-white (creamy in some lights). Breast and belly—buff-wash colour, becoming more intense on flanks which were markedly rufous-brown. Soft brown band across lower breast. Under tail-coverts—buff. Legs—light flesh-brown. Bill—medium pinkish-brown; rather long. Gape—chrome yellow contrasting sharply with rather darker remainder of bill.

Britain has had only 3 records of Savi's this century, though until about 100 years ago the species still nested in several localities, including Wicken Fen. FRANCIS M. BOSTON

Aquatic Warbler in Middlesex.—On 28th August 1955, G. W. paid a visit to Brent Reservoir, Hendon, Middlesex, and found a bird which he subsequently identified as an Aquatic Warbler (*Acrocephalus paludicola*). It was found in a place at the water's edge which is densely covered with reed, sedge and high grass. The bird stayed on top of the grass in full view for some moments, and G. W. was at once struck by its bright yellowish colour and by its striking head-pattern with buff stripes over the eyes and a broad, buff stripe down the middle of its crown. Before any other details had been noted it disappeared into the sedge, uttering a short, rather loud "teck". About 20 minutes later the bird was found again in the same place but only briefly seen. G. W. was struck by the fact that this bird behaved exactly like an Aquatic Warbler he had seen only 8 days previously in France: both stayed for some moments in full view on top of the grass and the note in each case was exactly the same.

Later that day E. H. W. visited the same area at G. W.'s request. After an hour's search he found the bird and, apart from having good views of the head-pattern, noted that it was also prominently streaked on the upper-parts, including the rump, while there were distinct markings on the under-parts as well. The bird seemed to him to be much more buff in colour than any Sedge Warbler (*A. schoenobaenus*), and the central crown-streak was much broader and more clearly defined than is the case with young Sedge Warblers. G. WARBURG and E. H. WARMINGTON

[Details of two other Aquatic Warblers recorded in England in late summer 1955 were published in a previous issue (*antea*, vol. xlvii, pp. 514-515).—EDS.]

Recognition and repulsion of a predator by Spotted Flycatchers.—During early July 1955, a pair of Spotted Flycatchers (*Muscicapa striata*) were attending young in a nesting-box in the garden of my home at Bishop's Stortford, Hertfordshire. Their territory included a white cherry-tree, the fruit of which became ripe during the first week of the month. During this period the tree was visited regularly by three Grey Squirrels (*Sciurus carolinensis*). The adult flycatchers strongly resented their presence and during the afternoon of 2nd July I was able to watch both birds displaying at and actually "mobbing" the squirrels. The threat display was generally carried out from some branch, just out of the immediate range of the animals. It consisted of vigorous wing- and tail-flicking accompanied by scolding notes, similar to the normal alarm notes but rather more incisive—"tzeck-tzeck". This had little effect in driving away the squirrels. However, the "mobbing", in which the birds flew at the backs and heads of the animals, at least caused a pause in their feeding. On several occasions they retreated into the cover of the foliage. Complete withdrawal was only seen once, on 5th July, when my father, W. J. Wallace, saw one squirrel being chased across a lawn near-by with both parent birds in full cry behind.

Records of threat display from birds holding territories are common, but such ready recognition and effective holding-off of a potential predator seem worth recording. D. I. M. WALLACE

Meadow Pipit nesting in building.—On 5th June 1955, a nest of the Meadow Pipit (*Anthus pratensis*) was found in a cavity on an inside wall of a roofless building at Moor House, a Nature Conservancy Reserve situated near the source of the River Tees, Westmorland. The nest contained five recently hatched young and the identification was subsequently confirmed by observation from a hide. The nest-site was about 4 feet above ground-level and the nest was situated in a cavity 7 inches deep and with an entrance measuring 6 by 4 inches. The building was surrounded by heather-moor at an altitude of 1,700 to 1,900 feet and many suitable nest-sites occurred in this area. Thus it seems unlikely that this site was chosen because of the lack of more normal ones.

This type of nest site would appear to be uncommon since, out of 360 nest-record cards examined, there were no records of this species breeding on buildings. The site chosen by this pair of Meadow Pipits was typical of those used by the Pied Wagtail (*Motacilla alba*) in this area and, in fact, the cavity had been created three years previously to provide a nesting site for the latter species. J. C. COULSON

Richard's Pipit on Bardsey.—On 22nd August 1955, a pipit, which was later identified as a Richard's Pipit (*Anthus richardi*), was found by G. E. Thomason and J. G. Williams in an area of burnt gorse and long grass on Bardsey Island, Caernarvonshire. Their attention was first caught by the white tip to the bird's tail when flushed. This was later found to be due to the advanced state of moult, the bird apparently having only three or four tail feathers and the white "tip" being one of the outer tail-feathers which had overlapped the remaining rectrices. The bird, which was very tame, was watched by G. E. T., J. G. W., M. E. Jones, Mrs. K. N. Campbell and the writer from 15.50 hours until 19.10 hours: the following observations were compiled from our combined notes, and from those of E. Bryne, who saw the bird on 24th August, which was the last date on which it was seen. Its most striking features, apart from the tail, were its large size, long legs, general warm orange-brown colouring with bold markings, and characteristic gait. The bird ran very fast, with head held low to facilitate easy progress through the long grass, and as soon as it stopped it stood bolt upright and peered at us over the top of the vegetation; it seemed to prefer to escape our attentions by running, and took flight only if we approached nearer than about ten feet.

Detailed description—*Upper-parts :* Forehead and crown, buff-brown, closely streaked with dark brown; ear-coverts similar but paler. There was a bold creamy-white stripe over the eye (extending only just beyond the eye) and below the ear-coverts; and below this was a dark moustachial streak. Nape, greyish, but this was due to loss of feathers, and the bird was very "scruffy" in the region of the neck. Back, orange-brown, boldly marked with rows of dark brown spots, reminiscent of the back-pattern of the Water Rail (*Rallus aquaticus*). Closed wing, dark brown, with orange-buff edgings to the feathers and showing a light orange-brown patch in the region of the secondaries; tail, dark brown with a white tip (see note above about state of moult). *Under-parts :* Chin and throat, dirty white, unmarked; breast, pale buff, boldly streaked dark brown; belly, yellowish-buff, again streaked dark brown; but not so boldly; the under tail-coverts appeared whitish and unmarked. Flanks darker than rest of under-parts, a rich orange-buff. *Soft parts :* Bill was longish, the upper mandible was dark brown, the lower pinkish-yellow, both mandibles darker at tips. Legs, orange-pink in colour; they seemed a good deal thicker, as well as longer, than those of a Meadow Pipit (*Anthus pratensis*). The hind claws were longer than the hind toes; this point was especially looked for, and was clearly seen on several occasions. The bird was not heard to call although it was watched for many hours, and flushed on numerous occasions. ROY THEARLE

[It should be remembered that only three days earlier, on 19th August 1955, a Richard's Pipit was seen in Co. Donegal (*antea*, pp. 44-45).—EDS.]

Tawny Pipit in Middlesex. — On 17th October 1954, at approximately 11.15 hours G.M.T., whilst walking round the Perry Oaks sewage farm, Stanwell, Middlesex, we saw a pipit which immediately attracted our attention on account of its large size and pale coloration. The following account is compiled from our joint field notes:—The bird was first seen feeding on one of the sewage-beds at a range of about 12-15 yards and it was accompanied by a Meadow Pipit (*Anthus pratensis*). In comparison it was noticeably larger and paler with a more upright stance and longer legs. The dorsal surface from the crown of the head to the rump was a light sandy colour; the back had a slightly mottled and striated appearance, but this did not extend to the nape of the neck or rump which were unmarked. The central tail-feathers were darker and the outer tail-feathers (seen in flight) were white. The wings generally were darker than the back, particularly the secondaries and greater wing-coverts, both of which had buff tips to the feathers, most noticeable on the latter. The lores and ear coverts were the same colour as the crown and there was a faint but noticeable superciliary stripe which broadened out immediately behind the eye. The whole of the ventral surface was a light buff shade; the throat was unmarked and there was no moustachial effect. The breast was boldly but not densely streaked, these streaks becoming sparser towards the lower belly and flanks which were unmarked. Bill dark brown, legs difficult to determine as they were almost obscured by mud; M. C. thought they were brownish and B. L. S. thought they were reddish but neither of us could be certain. The gait was a fast walk and the flight undulating. We both heard the bird call and B. L. S. rendered it as "tzi-ic" with a quite noticeable pause between the two syllables. The call did not seem as loud or harsh as that of the Meadow Pipit.

We later consulted *The Handbook* and decided that the bird was a juvenile Tawny Pipit (*Anthus campestris*) in the process of moulting into first-winter plumage. BRYAN L. SAGE and M. COOPER

The field-characters of the Ortolan Bunting in autumn.—In the past four years I have encountered a number of Ortolan Buntings (*Emberiza hortulana*) on autumn migration, and I have become reasonably well acquainted with the field-characters of the species, which are very inadequately described in British text-books. Field-identification is a very subjective process, and some characters conspicuous to one observer will doubtless be valueless for others, but the following notes, based on observation of about 70 birds in five countries, may help with the identification of this difficult bird.

As with most Passerine species in autumn, the most useful and reliable character of the Ortolan is the voice. The normal flight-note (also frequently used when the bird is settled) is a characteristically soft and *liquid* "tsip" or "tlip", by which alone the bird may readily be identified once the call is known. In flight this call grades over into a disyllabic "tillip" which I cannot distinguish from the corresponding call of the Yellowhammer (*Emberiza citrinella*). An even more distinctive note is a loud, explosive "chewp", but this is only given by some birds, which I suspect may be exclusively males.

The plumage-characters vary very much with age and sex, and few characters are reliable and constant; some birds very closely resemble young Yellowhammers. Perhaps the most constant feature is the very neat and *regular patterning of the mantle and wing-feathers in blackish and whitish,* this forming an inverted horseshoe shaped area, which (from behind) frames the *warm buff rump,* usually noticeably different in colour from that of the Yellowhammer.

The head-plumage, though variable, is usually distinctive, this impression often being accentuated by the *short, pale bill,* which is by no means always pinkish. The head usually appears rather dark and uniform, greyish or brownish in young and *greenish in old birds,* with a yellowish moustachial stripe (sometimes continuing below the ear-coverts) visible at close range. The yellow "spectacle", though sometimes very conspicuous, is a most misleading character for young birds: young Yellowhammers frequently show this feature more conspicuously.

The ground colour of the under-parts is a warm, pale brown (rufous in old males), and the legs are usually more reddish than those of a Yellowhammer. Certain points of stance and behaviour (notably a tendency to perch on the extreme top of trees and bushes) are also distinctive, but these points are difficult to describe and are not particularly useful in identification.

I. C. T. NISBET

[We have shown Mr. Nisbet's note to several observers with particular experience of Ortolan Buntings in autumn. L. S. V. Venables describes calls heard in Shetland as "tew" (a high whistle), "tip" (high and very curtailed) and "tew-tip" (a combination of the two notes). R. A. Richardson renders the call as "pwt" (clipped and liquid) and agrees with the importance of the voice as a field-character; he also stresses that the bird's general appearance reminds him of that of a Tree Pipit (*Anthus trivialis*) because of its pale spectacle, warm brown, striated upper-parts, double wing-bar, pinkish-buff breast and white outer tail-feathers; adding that the flight and flight-silhouette are also very Tree Pipit-like, the former strong and direct with regular undulations, quite unlike the rather erratic action and long-tailed appearance of Yellowhammers on the wing.—EDS.]

REVIEWS

LOCAL REPORTS

REPORT ON SOMERSET BIRDS, 1953 (40 pages, 1 plate, 1 map) and 1954 (48 pages, 1 plate, 1 map). Compiled from reports of members of the Somersetshire Archaeological and Natural History Society, Ornithological Section. Secretary and Recorder: G. H. E. Young, Goodlands, Barrington, near Ilminster, Somerset. Price 5s. each.

THIS well-presented Report looks a good example of how the job should be done. Its preparation is in the hands of a committee, whose names are listed in the Report. The systematic list (about 30 pages) is arranged in Wetmore order. There is also a list (2 pages) on arrival and departure dates of summer-migrants, and noteworthy items in this list are also mentioned under the appropriate species in the main body of the Report, thus ensuring that the latter is complete in itself. Each Report includes a map of the county; this map is divided into 7 districts, and each record in the systematic list is referred to its appropriate district. On the other hand there is no indication of the standards applied in accepting records, but in the case of some of the rarer birds some of the details of identification are given—this might well be expanded.

The 1953 Report includes the following:—Great Northern Diver from January to late April, and 3 in November. Slavonian Grebe in March. An early breeding Little Grebe had 2 very small young on 16th April. Gannet inland at Chew Magna reservoir on 15th September. About 90 occupied nests at Somerton heronry, and 6 other heronries totalled about 113 nests. Maximum counts from a number of different areas are given for several species of duck. A male Red-crested Pochard on 11th October. Eiders in 2 localities in April and one in December. Grey Lag Goose on 23rd March. White-fronted Geese reported from several places, maximum 616 at Steart in January. Barnacle Goose, 1 with the Steart White-fronts. A Buzzard's nest in a beech hedge could be reached from the ground. A Kite seen on 2 dates in June on Brendon Hills, and in October on Exmoor. Several Hen Harriers. Montagu's Harrier in September. Several records of Black Grouse, including 2 parties of 8. Quail heard in summer in 7 localities. Corncrake reported from 7 localities, evidently increasing. Large flocks of Lapwings in autumn and winter, with maximum at least 8,000 at Steart in January. At least 83 Grey Plover at Steart in November, and in the same month about 750 Golden Plover at Minehead. A flock of about 150 Snipe in November. 2,000 Curlew at Steart in September. A flock of more than 90 Whimbrel at Cheddar in May. Green and Common Sandpipers in winter. 4 Spotted Redshanks in autumn, and 5 Grey Phalaropes. A Little Gull in September. About 15,000 Black-headed Gulls to roost at mouth of Avon in January. Sabine's Gull in May (see *antea*, vol. xlvii, p. 26). Several autumn Black

Terns, including one as late as 30th October. Sandwich Tern on early date of 28th March. Swifts on 27th and 30th September, both late dates. 2 Hoopoes in April and one in autumn. Flock of over 100 Ravens in March. Flock of 167 Carrion Crows in December. 12 breeding pairs of Stonechats in a 4-mile strip of Exmoor. Several wintering Chiffchaffs. A Firecrest on 8th February. A Blue-headed Wagtail with " lavender-blue head and face markings " in April. A Great Grey Shrike from 26th April to 9th July. Lesser Redpolls bred in west Somerset. A Twite in September. A number of Crossbills between July and December.

The 1954 Report includes an account of the establishment of the Steep Holm Trust. The following are extracts from the systematic list:—2 Black-throated and 2 Red-throated Divers at Cheddar in December, and a Great Northern Diver at Dunster. A Red-necked Grebe on sea on 22nd August. One or 2 Slavonian Grebes in January-February. Leach's Petrel in October and November. 105 Manx Shearwaters passed in an hour off Minehead on 18th July. 2 Shags on inland waters. 95 Heron's nests at Somerton and 14 other heronries held about 240 nests—presumably the 1953 count was far from complete. Bitterns in February and December. A Spoonbill at Chew Valley reservoir on 2nd May; at least 1,000 Mallard and 1,300 Teal at this reservoir on 17th December; a pair of Wigeon on the unusual date of 18th July, and 70 Pintail on 21st March. 2 Ferruginous Ducks at Durleigh reservoir on the unusual date of 30th May. Goldeneye reached a maximum of 39 at Blagdon on 10th April. An Eider from January to March. 8 Smews still present on 14th April. Moulting Shelducks in Bridgwater Bay totalled about 2,500 on 22nd August. White-fronted Geese seen in a number of localities, maximum about 750 at Steart in March. A Brent Goose on 4th April. 15 Bewick's Swans in March. Buzzards breeding far and wide in the county. 2 Marsh Harriers in August and one in September. One Hen and 3 Montagu's Harriers. Up to 19 Blackcocks at Exmoor "leks". One Quail heard. Last year's increase of Corncrakes seems maintained. About 2,000 Coots at Chew Valley reservoir in December; a Little Ringed Plover there on 9th May. A number of Golden Plovers of Northern form in April. Curlew nesting in many parts of the county. Several spring and autumn records of Black-tailed Godwits, maximum 20 on 2nd August. 3 or 4 Green Sandpipers and 1 Common Sandpiper in winter. Spotted Redshanks in September and November. A Purple Sandpiper at Minehead in October, first since 1941. Temminck's Stint on 29th August (identification details not published). Pectoral Sandpiper at Minehead, 8th-16th September. One or 2 Avocets at Steart, January to April, and one occassionally, August to November. 3 Ruffs in January, 4 on 7th July, and several others in spring and autumn. About 4 Grey Phalaropes in autumn, latest 5th December. Iceland Gulls in March and December. Sabine's Gull in August (see *antea,* vol. xlviii, p. 83). 90 Black Terns at Chew valley reservoir on 9th May and the exceptional number of 170 there on 5th August (see *antea,* vol. xlviii, p. 178). A Roseate Tern at Cheddar reservoir, 5th-7th May. Little Auk on 30th November. 4 Black Guillemots off Dunster on 7th February. One Hoopoe in spring and 2 in autumn. 2 Wrynecks in August. Golden Oriole on 22nd-23rd May. Rook's nest on top of electricty pylon. Flock about 12 Long-tailed Tits came in high from sea at Minehead on 3rd October. 3 male and 2 female Blackcaps in January or February. A Willow Warbler on early date of 14th March. 3 probable Chiffchaffs wintering in January or February, and one in December. 2 Water Pipits in February. 2 variant Yellow Wagtails in spring. 3 parties of Crossbills in January. 4 Snow Buntings in autumn. P.A.D.H.

ORNITHOLOGICAL NOTES, BRISTOL DISTRICT, 1953 (16 pages) and 1954 (22 pages). Compiled from reports of members of the Bristol Naturalists' Society by H. H. Davis and P. J. Chadwick. Obainable from H. H. Davis, Little Stoke Farm, Patchway, nr. Bristol. Price 1/- each, post free.

THE area covered is partly in Gloucestershire, partly in Somerset. The notes are compiled by members of the committee responsible for the annual report on Somerset birds, and it is reasonable to assume, even to expect, a full exchange of information between the two bodies. The reports of both bodies convey an impression of careful preparation and high standard of scrutiny of the observations sent in for publication, and in the two years under review there is no indication that any records have been accepted by one report although rejected by the other. It is disconcerting, however, to find a large number of discrepancies between the two reports on matters of dates and numbers (many of them giving the appearance of carelessness), and some evidence of incomplete exchange of information. Examples of discrepancies occur in 1953 under Gannet (September 5 in Bristol Notes reads September 15 in the Somerset Report), Cormorant, Goldeneye, Buzzard, Ringed Plover, Golden Plover, Woodcock, Common Sandpiper, Little Stint, Dunlin, and in 1954 under Gadwall, Pochard, Goldeneye, Sanderling, Kittiwake. It should be mentioned here that there is nothing to show which report is right and which wrong, and this criticism might have appeared equally well in the review of the Somerset Report (above).

Regarding incomplete exchange of information, examples occur in 1953 under Teal, Shoveler, Tufted Duck, Pochard, Eider, Dipper (Bristol Notes say no evidence of breeding at Stanton Drew, but Somerset Report says nest and eggs April 18); in 1954 under Smew, Shelduck, Greenshank.

It generally appears that the Somerset Report has the fuller information. In addition to the examples cited above, the two reports naturally differ somewhat in the selection of items for publication, so that those interested in the area will find it useful to have both reports. The main Somerset items are noted in the review of the Somerset Report, and so reference is not again made to them here.

Notable Gloucestershire items include the following. In 1953:—Young Little Grebes still being fed on 18th October. A Spoonbill at New Grounds in mid-October. A Garganey at New Grounds from September to end of year. White-fronted Geese at New Grounds reached 4,700 in January; there were 3 Lesser White-fronted Geese in the early part of the year, and one October-December (*antea,* vol. xlviii, p. 326); at least 5 Bean·Geese, January-March; up to 5 Brent Geese in December; and 3 Barnacles, January-March; 3 Bewick's Swans in January. Several Quail heard in late June and July in two areas. Waders at the New Grounds included 4 Black-tailed Godwits and 2 or 3 Wood Sandpipers in August, and wintering Green Sandpipers and Greenshanks; Ruffs in autumn reached 32 in September, 4 remaining to winter. Counts of Common Gulls roosting on New Grounds sand-banks showed about 10,500 in January, 24,750 on 1st November. A Little Auk on 4th October. A Hoopoe in April. A Blackbird's nest with 4 eggs in late December (*antea,* vol. xlviii, pp. 120-126). Several Crossbill records in autumn.

In 1954:—A second-year Gannet found inland on 18th July. Unusual numbers of Pintail at New Grounds, the highest being 273 males (females not counted) on 28th December. A Long-tailed Duck at Slimbridge in November-December. At the New Grounds there were 3 Grey Lag Geese from December 1953 to March 1954; 4 Lesser White-fronted Geese in the early part of the year, including one which had been present at the end of 1953 (*antea,* vol. xlviii, p. 326), up to 4 Barnacle Geese in February-March, and one in December; a Red-breasted Goose, January-March (*antea,* vol. xlviii, p. 136); and 2 Whooper Swans in February. Buzzards in several localities in spring, but breeding not proved. Counts of Turnstones at Severn Beach approached 200 in August and September. Up to 20 Black-tailed Godwits in autumn. 2 Spotted Redshanks in November. 2 Ruffs at New Grounds in February, and 5 Avocets there in August. 2 Glaucous Gulls in December. 292 Black Terns counted in 3 hours on 9th May (*antea,* vol. xlviii, p. 166). 2 first-summer male Golden Orioles in June-July. 4 birds on 23rd April, not Yellow Wagtails, were probably Blue-headed.

P.A.D.H.

REPORT OF THE NATURAL HISTORY SECTION OF THE WILTSHIRE ARCHAEOLOGICAL AND NATURAL HISTORY SOCIETY. Wiltshire Bird Notes for 1953 (14 pages) and 1954 (11 pages). Edited by Ruth G. Barnes and Guy Pierson. Obtainable from the former at Hungerdown, Seagry, Chippenham.

THE Wiltshire bird notes comprise well-arranged classified lists of 11 pages and 10 pages respectively, with a short but valuable introduction in each year. The society's work consists more of collection than of organization of observations, but its activities appear to be expanding, and much useful and thorough observation is reported. It is gratifying to see that an enquiry has been launched into Passerine migration along the chalk escarpment.

In 1953 a Red-throated Diver was seen in March and a possible Great Northern Diver in February. A Manx Shearwater is mentioned for July 1951, seven days after being ringed at Skokholm. Gannet on 23rd August. 3 pairs of Buzzards nested, and four other pairs seen in summer; 2 or 3 pairs of Montagu's Harriers recorded (information on this and other scarce breeding-species is wisely suppressed). A Goshawk on 19th October. Unusual numbers of Quail: records are given from 14 localities and from two of these "many" were reported. Two summer, and many autumn, Corncrakes. About 13 pairs of Curlews recorded. Kittiwake on 23rd March. Little Auk on 12th February. Short-eared Owls numerous in winter. Hoopoes in May and June. Golden Oriole in April. 3 pairs of Stonechats bred, and 3 pairs of Dartford Warblers were seen: these two species are thought to be recovering their numbers slightly. 24 Waxwings in February; a Great Grey Shrike in March. Crossbills at 3 places, June-August. Four or five Lapland Buntings at Rodbourne sewage farm on 13th December (*antea,* p. 8) are the first for the county: the details given are adequate but the description has been summarized by the editors and several important points are omitted.

In 1954 a Red-crested Pochard in December and 8 Bewick's Swans in February are the first records for the county. Grey geese were seen in some numbers at three places on 17th January. Seven Buzzard nests were reported, and 4 other pairs in the breeding-season. Only one record given of Montagu's Harrier. An Osprey remained throughout June and July 1951. A report of over fifty Quail in two areas is remarkable, and it would be interesting to make a detailed study of this species. Corncrake in January, and two July records. Two Oystercatchers in March, a Greenshank in August, and a Grey Phalarope from 28th October to 3rd November. A special article by J. K. Stanford describes the recent colonization and increase of the Curlew; 12 to 20 pairs probably bred in 1954 and the increase continues despite disturbance and other hazards. 20 Black Terns in May (*antea*, vol. xlviii, p. 166). 3 Hoopoes in May. A Raven found shot early in the year. No breeding-records of Stonechat, and no Dartford Warblers. Black Redstart in January and October. A pair of Marsh Warblers in June. A Firecrest in December. A few Crossbills in March.

Apart from the Lapland Buntings, and a square-bracketed record of a Night Heron in 1954, the details given of unusual birds are extremely scanty, and some records (e.g. that of the Goshawk) deserve better evidence, especially as no mention is made in the report of the standards adopted in such cases.

Among behaviour notes we were impressed by a record of a Hoopoe waving two white flags, but this seems to have been meant figuratively. I.C.T.N.

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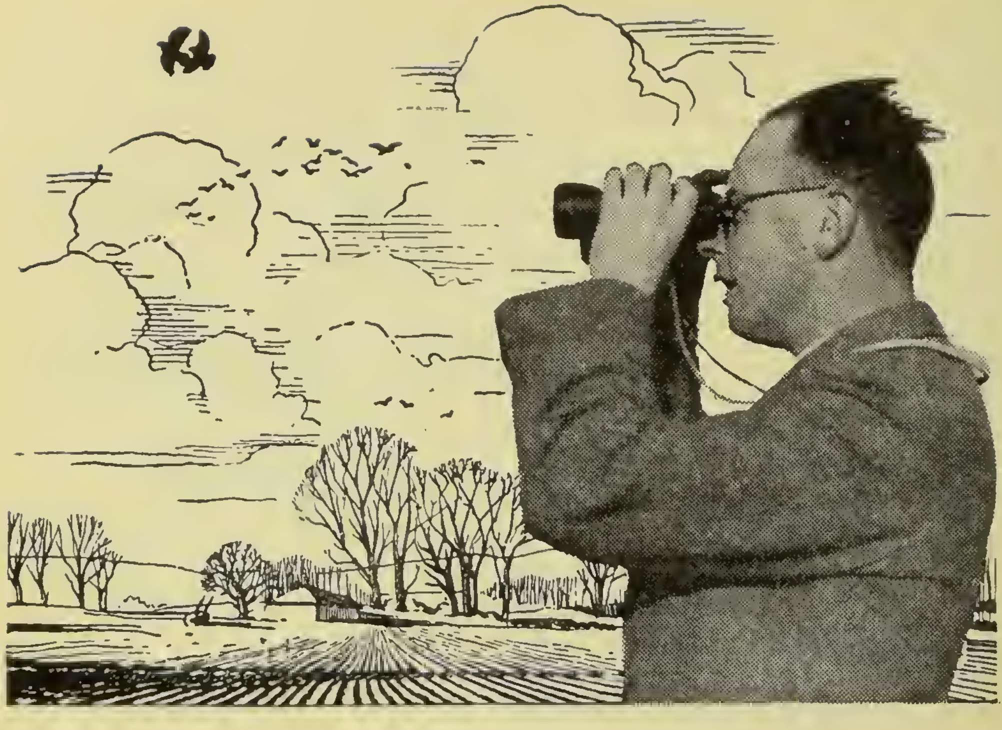

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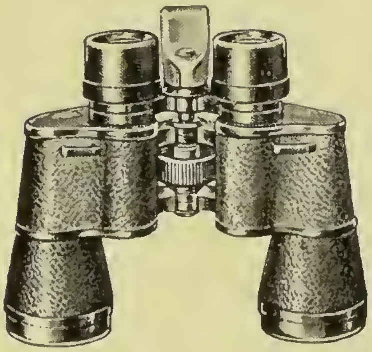

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BRITISH BIRDS

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Cover photograph by Eric Hosking: Black Tern (*Chlidonias niger*) at the nest

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BRITISH BIRDS

EDITORIAL

CAPTIVE BIRDS AT LARGE

ONE of the perpetual problems of the British ornithologist is to distinguish birds which have been imported, or artificially bred of imported stock, from those which have reached the country wild and free. Improved communications and techniques of aviculture, and the growing interest in rearing exotic species and in keeping them in a free-flying state are complicating the situation.

Editors and others who have to cope with these questions find it hard to ensure that they are adequately informed of the possibilities of error, and there seems much to be gained by a thorough sifting of the situation and by encouraging all those who can make a contribution to it to come forward with additional facts or suggestions. In order to start the ball rolling Mr. Derek Goodwin has kindly drawn upon his experience as a field ornithologist, an aviculturist and a museum expert in writing the article which follows.

This valuable exposition will, we hope, be matched in due course by others dealing with the special problems arising from collections of swans, geese and ducks and from falconry, both of which may result in bird-watchers encountering some unexpected individual which might well pass as having reached here in a wild state.

It will be time enough to attempt to reach conclusions when the discussion which we hope to stimulate has taken place. At this stage it may be more helpful to try to frame some of the questions which seem to require an answer.

First, how can ornithologists be better informed as to the possible sources of escaped birds? Zoos, parks and other organised collections are relatively easy to keep in touch with, but private breeders and small dealers may cause confusion by losing or deliberately releasing captive birds, which may immediately move to some other area, even crossing the sea.

Closely linked with this is the question of plainly marking any captive birds liable to be found at large. Some progress has been made here, but there are serious obstacles, for example when captive birds nest in a more or less free state and their unmarked progeny scatter far and wide, causing almost insoluble problems for students of bird distribution. These are particularly unfortunate in cases such as the Collared Turtle Dove (*Streptopelia decaocto*), Cattle Egret (*Ardeola ibis*) and Red-crested Pochard (*Netta rufina*) which are undergoing important changes in their world distribution and which are simultaneously the objects of sometimes carefree treatment by aviculturists, who do not have to worry over the resulting conundrums.

Another large question is the ever-changing pattern of species which are imported and liable to escape. Some, such as parrots (*Psittacidae*) or Pekin Robins (*Leiothrix lutea*) could almost certainly be nothing but escapes, yet even these often consume much time in sifting rumours and answering enquiries. Mr. Goodwin mentions one of the most notable recent cases of this type, a House Mynah (*Acridotheres tristis*) which survived about four years in St. James's Park, London, summer and winter, although in its native haunts it is one of the earliest birds to drop out with the transition to a less hot climate, being very common in the Indus valley but unknown above about 4,000 feet in Baluchistan. It is accordingly very difficult to rule out even sub-tropical species as being unable to maintain themselves in our climate through all seasons.

Many more difficulties arise from species which although equally unlikely to reach our islands unaided may well be confused, reasonably or unreasonably, with some British species or potential visitor. Mr. Goodwin gives two such examples taken from the serins (*Serinus* spp.) and the doves (*Streptopelia* spp.), and also mentions Avadavats (*Amandava amandava*) being misidentified by three birdwatchers as Scarlet Grosbeaks (*Carpodacus erythrinus*). It will evidently never be possible to gauge the full extent of such hazards, and their existence emphasizes the importance of taking nothing for granted and of immediately recording and preserving the fullest possible details of all suspected rarities even when the observer may feel sure of the identification. Those who are tempted to identify rarities merely by process of elimination, after satisfying themselves that their bird could not have been any other on the British List, are in special danger of being fooled by some unsuspected "escape" which would equally correspond to an imperfectly recorded description.

Species which are imported and are also likely to occur wild have already been mentioned, and their treatment raises the utmost difficulties. Good ornithologists have recently differed from us over the admissibility of British records of the Red-headed Bunting (*Emberiza bruniceps*), on this very issue whether the birds had been imported or had come here unaided, on which we have felt bound to take the cautious view. It may be that fuller information will in time throw fresh light on such matters, as in the case of previously excluded transatlantic migrants which must now be regarded as in principle admissible in the light of indisputable evidence of recent crossings by land-birds. Certain species such as the Flamingo (*Phoenicopterus ruber*) and the White Pelican

(*Pelecanus onocrotalus*) have been viewed with the utmost suspicion despite the fact that genuine wanderings to Britain on their part would be far easier than in that of many species whose occurrences are received without question and which might more easily have been imported and escaped without the fact being traceable. In such cases the problem is complicated by the possibility of Continental escapes having crossed to the British Isles.

Even certain British breeding species or more or less regular visitors, such as the Bearded Tit (*Panurus biarmicus*) and Golden Oriole (*Oriolus oriolus*), may be escapes, and this possibility must particularly be borne in mind when they appear at unusual seasons or in unusual places; Golden Orioles, in fact have been regularly advertised by more than one dealer and though they are probably of the Indian race (*O. o. kundoo*), this differs, in effect, only in the male's having the black facial streak extending behind the eye. Again, Choughs have several times in recent years been recorded from Kent and Sussex and it was discovered that these were wanderers from Pippingford Park (see *Avic. Mag.*, vol. 57, p. 73).

Mr. Goodwin makes a very valid point regarding the importance of studying behaviour even of known escapes in order to gain more knowledge. Some such birds linger in the original locality while others wander apparently at random and others still may develop separate summer and winter-quarters and "migrate" regularly between them. For certain species escapes may be virtually confined to one season or to one sex or to individual birds, while in other circumstances pairs or even parties may escape together.

It is to be hoped that by concentrating more attention on this subject it may be possible to obtain both a better idea of the risks of confusion and of some practical methods of guarding against them. Meanwhile, it is abundantly plain that only great caution can prevent great blunders.

THE PROBLEM OF BIRDS ESCAPING FROM CAPTIVITY

By Derek Goodwin

The acceptance or rejection of rarities and new candidates for the British list is often made difficult by the possibility of their being escapes from captivity. In many cases a certain decision is impossible and the only practical course is to take into consideration all the evidence and decide for the likeliest hypothesis. This article is written principally in the hope of giving assistance in this respect. Secondarily, it will, I hope, stimulate bird-watchers to identify and observe even those species which are obvious escapes. The behaviour and adaptability, or lack of it, of birds which thus find themselves far from their normal range and often far from any suitable environment, is of the utmost interest.

It would take too long to discuss all the species which have been imported and sold in this country during the past ten years. It must be remembered, therefore, that the birds dealt with in this paper are in the main only those which have been, and in many cases still are being, imported into this country in some quantities. Also, the numbers of the different species imported may fluctuate widely in response to trade, politics and other factors. Probably by the time this appears in print some species not even mentioned herein will be on sale in thousands and some now to be found in every bird-dealer's will no longer be obtainable.

In assessing which birds have been most commonly imported since the war I have relied very largely on dealers' advertisements appearing in *Cage Birds* and other journals. One possible source of error here is that birds readily sold may be advertised only once whereas a like number of some less popular or more expensive species might be "on sale" for a considerable period. As an example of this the "pet department" of a certain London store had the same pair of Bronzewing Pigeons (*Phaps calcoptera*) "on sale" for about four years in the 1930s. In most cases, however, I think I have made a fairly accurate guess at the state of affairs. No attempt has been made to gather statistics of the numbers involved. In the more abundantly imported species—such as many of the small African or Asian seed-eating Passerines—it must run into very many hundreds, and more probably thousands, of each species in the course of a year.

COUNTRIES OF ORIGIN

The Budgerigar (*Melopsittacus undulatus*), Bengalese Finch (*Munia striata*, domestic form), Zebra Finch (*Poephila guttata*) and Diamond Dove (*Geopelia cuneata*) are now domesticated and the majority sold are bred in this country. In some other species, especially in some of the parrots, breeding accounts for a large proportion of the specimens extant in this country. Most foreign birds offered for sale are, however, wild-caught specimens. The main exporting countries—or at least the regions whence the birds originate—are India, West Africa, South America (probably Brazil), Central America (? Mexico) and the Indo-Malayan region. Australia and southern Africa (? Portuguese East Africa) contribute to a somewhat less extent. (Many of the Australian seed-eaters are fairly easy to breed in warm climates, where termites can be obtained *ad. lib.* and many of those appearing on the markets are, I understand, captive-bred specimens from South Africa.)

GROUPS AND SPECIES IMPORTED

Weaver-finches (Ploceidae).

Weavers, whydahs, waxbills, munias and grassfinches of various species are imported in considerable numbers. None of them is at all likely to reach Britain unaided. In many, either both sexes or the males in breeding plumage are strikingly coloured. None closely resemble any European species. Nevertheless, I know of a case where three bird-watchers—field-guide in hand—mis-identified escaped Avadavats (*Amandava amandava*) as Scarlet Grosbeaks (*Carpodacus erythrinus*)! The true sparrows are seldom imported with the exception of the Golden Sparrow (*Passer luteus*) which has been widely offered for sale. In its yellow, brown, and chestnut plumage it might at first glance be mistaken for one of the vagrant buntings.

Finches and buntings (Fringillidae and Emberizidae).

Now that it is illegal to sell British birds, other than close-ringed, captive-bred specimens, the European races of the Bullfinch (*Pyrrhula pyrrhula*) are no longer imported and sold in numbers, as was formerly the case. Many foreign finches are, however, commonly on sale, although their numbers, in species and individuals, are less than those of the weaver-finches. Some are quite distinctive, but others of this group are the most apt of any to cause confusion. Some of the African canaries (*Serinus* spp.), including the abundantly imported Green Singing Finch (*S. mozambicus*) are very like the Serin (*S. canarius serinus*) in general appearance and mannerisms. Hence it is important to notice the markings of any strange greenish or yellowish finch in some detail before coming to conclusions as to its identity (see discussion on page 344-345). The Common Rosefinch or Scarlet Grosbeak (*Carpodacus erythrinus*) has been imported, and presumably sold, in large numbers. Some of its occurrences in Britain of recent years should, therefore, be viewed with suspicion.

Of the true buntings (*Emberiza* and allied genera) only the Red-headed Bunting (*E. bruniceps*) has been, and is, imported and sold in any appreciable numbers. The bird is usually sold under the dealers' name of "Indian Yellow Bunting" or simply as "Yellow Bunting". The price asked is less than that for most foreign birds and much lower than that of any British finches with comparably bright plumage. This fact and the large numbers involved make it almost certain that birds of this species will in many cases have been bought by people with no real or lasting interest in bird-keeping. Such people are particularly likely to let their birds escape through carelessness or to tire of and liberate them. Judging by the number of recorded occurrences of this species in recent years some such factor seems likely to have been at work.

Some of the American "buntings" (*Passerina* spp.) are imported and sold, seldom in very large numbers. These brilliant finches are hardly to be confused with any species that might get here by its own efforts.

The breeding of finch hybrids, between different species of European finches or, more commonly between one of these and a domestic Canary (*S. c. canarius*), is popular with many bird-keepers. Such hybrids usually show their parentage fairly obviously (those with the Canary usually inherit indications of the streaked mantle and yellowish rump and belly of a wild Canary, rather than a clear yellow colour) but are often puzzling to the uninitiated. As they are often extremely hardy, with the wild parent's initiative but the canary's tameness in the matter of coming to widows or bird-tables for food, they sometimes survive considerable periods at liberty. I was recently shown a photograph of a bird which was associating with wild Greenfinches (*Chloris chloris*) and had puzzled several bird-watchers. It was a Goldfinch-Canary hybrid.

Timaliidae.

Several species of this group are imported. Since most of them come from the Himalayan regions and are non-migratory, or nearly so, they are never likely to occur here except as escapes. Most commonly imported is the Pekin Robin (*Leiothrix lutea*) of which dealers have had large numbers in recent years. In the past many attempts have been made to introduce this most attractive species, but without permanent success. Escaped or liberated birds have often survived for long periods and even reared young. Blue-winged Sivas (*Siva cyanea*) and Silver-eared Mesias (*Mesia argentigula*) have been imported in much smaller numbers. Several of the Laughing-thrushes (*Garrulax* spp.) have been on sale. The dealer's name "Jay-thrushes" gives a good impression of what Laughing-thrushes look like in shape and stance, though they are weaker-winged and keep more to cover than either thrushes or jays. With the exception of the Pekin Robin, none of these birds seems to be imported in any quantity.

Starlings (Sturnidae).

The Hill Mynah (*Eulabes religiosa*) is commonly imported. These big black arboreal starlings, with their orange legs and bills and yellow head skin, are quite unmistakeable. Vast numbers of young are taken from the nest and hand-reared, there being a considerable trade in them not only to Britain and Europe but to America and the Far East as well. Their tameness and powers of mimicry are well-known, but the "wolf-whistle" appears to be an innate note. A few Bank Mynahs (*Acridotheres gingianus*) have been imported since the war, as must at least one House Mynah (*A. tristis*) an escaped specimen of which lived for about four years in central London. The Rosy Starling (*Pastor roseus*) has been often on sale. Some of the African glossy starlings (*Lamprocolius* and *Spreo* spp.) are quite commonly imported and as they often breed well in captivity, English-bred specimens are sometimes on sale.

Thrushes and chats (Turdidae).

Of the more typical thrushes the only species frequently imported and sold is the Orange-headed Ground Thrush (*Geokichla citrina*). More than one of these handsome slate-grey and rufous-orange thrushes have escaped and been at large for some time in recent years. American Robins (*Turdus migratorius*), some of the rock thrushes (*Monticola* spp.) and Blue Whistling-thrushes (*Myiophoneus caeruleus*) are sometimes on sale, but in small numbers. Of the smaller birds of this family the Shamah (*Kittacincla macroura*) and the Magpie-robin (*Copsychus saularis*) are the only ones commonly on sale.

Other small Passerines.

Several species of bulbuls (Pycnonotidae) are fairly frequently imported, as are the more brightly coloured fruitsuckers (*Chloropsis* spp.). Of the Icteridae some of the hangnests or troupials (*Icterus* spp.) are sold, though not in large numbers. Others of this group are also on sale from time to time. Tanagers (Thraupidae) in some numbers and a few honey-creepers (Coeribidae) and humming birds (Trochilidae) are sometimes on sale. Of other birds that may turn up from time to time the only one worth mentioning is the Yellow Wagtail (*Motacilla flava*). Quite a number of "Indian Blue-headed Wagtails" have been offered for sale. All the evidence suggests that these birds did in fact come from India, and so more than one race occurring only rarely in Britain might have been involved. The possibility of Yellow-headed Wagtails (*M. citreola*) being among such consignments cannot be excluded.

Crows, pies, jays, etc. (Corvidae).

Relatively few of these are imported. Blue Magpies (*Urocissa*), Green Magpies (*Cissa chinensis*), the Wandering Tree-pie (*Dendrocitta vagabunda*), the Lanceolated Jay (*Garrulus lanceolatus*) and some of the South and central American jays are not infrequently on sale. The numbers involved are small, however, although as these birds tend to be long-lived, expensive and do not sell very freely, more may appear to be in the country than is actually the case. None of them can be mistaken for any species likely to occur naturally.

Pigeons and doves (Columbidae).

Many species are imported and sold. Shortly after the war some dealers were offering Collared Turtle Doves (*Streptopelia decaocto* (see discussion on page 346). More recently quite a number of Speckled Pigeons (*Columba guinea*), Red-eyed Doves (*S. semitorquata*), Spotted Doves (*S. chinensis*) Crested Pigeons (*Ocyphaps lophotes*), and Masked Doves (*Oena capensis*) have been on sale. Other species have been offered in smaller numbers, the common dealer's practice of inventing euphemistic names for the less colourful birds often making it difficult to decide from the advertisements exactly what species is involved.

Parrots, parrakeets, lovebirds, etc. (Psittacidae).

Great numbers of these were imported during the brief interval that the "parrot ban" was lifted. None of them is likely to get to Britain unaided nor would even the most eager rarity-hunter claim the Budgerigar seen on his lawn as a wind-drifted migrant from Australia.

Ducks, geese, etc. (Anatidae).

The keeping of birds of this group is popular and fashionable, being looked on with favour even by many who consider the keeping of wild birds of other families reprehensible. Possibly this is because it is common to mutilate them so as to prevent their ever flying again and then to let them wander in a garden, park or other large enclosure where they appear "free" to the uninitiated. It is, however, becoming increasingly the practice to leave the young of such birds intact and at full liberty. Whether from the standpoint of aesthetics, humanitarianism, or scientific study, this is to be highly commended but it inevitably casts suspicion on records of such species as Ruddy Shelduck (*Casarca ferruginea*) or Red-crested Pochard (*Netta rufina*). In this way the Mandarin Duck (*Aix galericulata*) has for some years become established in a wild state in parts of Surrey, Berkshire and elsewhere, and it still seems to be maintaining its numbers in spite of persecution by man. Various other species of foreign ducks are often locally, and usually temporarily, to be seen in a feral state, and all records of species known to be commonly kept must be highly suspect.

Game-birds (Phasianidae).

Game-birds of many species are imported from time to time and some pheasants, such as the Golden (*Chrysolophus pictus*), Amherst (*C. amherstiae*), Reeve's (*Syrmaticus reevesi*) and various kaleeges (*Gennaeus spp.*), are bred in fairly large numbers in captivity. Attempts have been made to establish many of them in Britain but have usually met with only local or temporary success, owing to the unceasing persecution from shooters which game-birds undergo in Britain.

The only game-bird confusable with a species liable to occur here naturally is the Rain Quail (*Coturnix coromandelicus*). This species has been imported and offered for sale occasionally in the past three or four years. It is extremely similar to the common Quail (*Coturnix coturnix*) in size and colouration, but in the hand can be at once distinguished by the plain unbarred outer webs of the primaries. Its call is also said to differ.

Serins and ring-necked doves.

In view of the westward extension of range of the Serin (*Serinus canarius serinus*) and the Collared Turtle Dove

(*Streptopelia decaocto*) and the importance of recording their arrival in any new localities it seems advisable to mention rather fully the means by which they can be distinguished from allied species frequently kept in captivity.

Of the many species of canaries (*Serinus* spp.) found in Africa the one that is imported and sold in large numbers is the one most easily confused with the Serin. This is the Green Singing Finch (*S. mozambicus*). The male Green Singing Finch can be told from the male Serin by its having a clearly defined pattern in grey and yellow on the face, brighter yellow *unstreaked* under-parts, and an unforked tail (see Fig. 1). There are other minor differences and it is altogether a brighter-looking bird. The female is duller than the male (and hence more easily taken for a Serin), has the flanks and sides of the breast heavily suffused with olive green and a usually conspicuous pectoral band of dusky spots. Juveniles resemble the female but are paler and browner with conspicuous yellowish-buff edgings to the wing feathers. The description applies to the race usually imported, which is *S. mozambicus caniceps*. Other races vary slightly in size and colour, but except that in some the dark areas of the male's head are greenish or olive rather than grey, these differences do not invalidate the above distinctions.

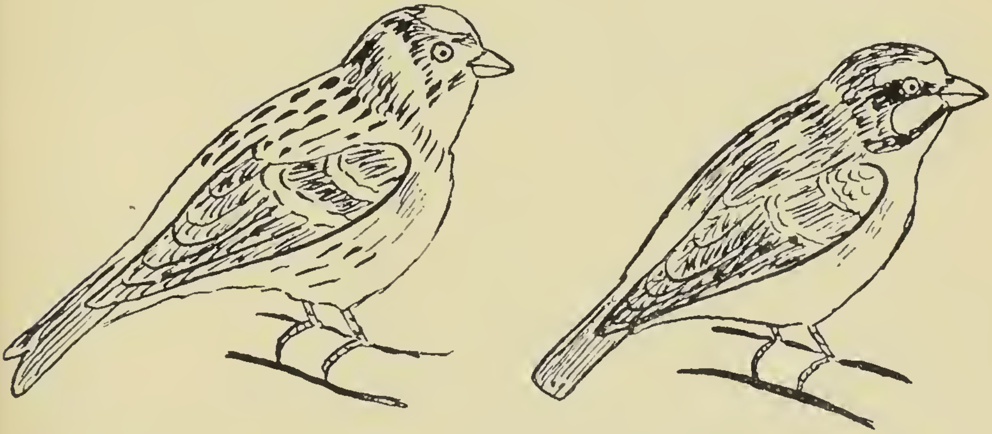


Fig. 1—Serin (*Serinus canarius serinus*) (left) and Green Singing Finch (*Serinus mozambicus*) (right)

This sketch is to show the clearly defined head-pattern, unstreaked under-parts and unforked tail of the Green Singing Finch, which may otherwise be mistaken for the Serin.

The European race of the Serin is not commonly, if at all, imported, so there is no reason to suspect the status of individuals seen. Recently some specimens of the Atlantic islands race (*S. c. canarius*), the ancestor of the domestic Canary have been exhibited at the London Zoo and it is possible that others may have found their way to bird-dealers' establishments. This bird is larger and has a longer tail than the European form, but otherwise much resembles it.

Although some years ago more than one dealer was advertising

"Indian Ring Doves", *S. decaocto* does not seem to have been imported since. As it is a rather sombrely coloured dove it is, however, likely that dealers would invent some euphemistic title for it, in some cases, rather than offer it under a recognizable name. The bird most commonly mistaken for *decaocto* is the Barbary Dove (which although given a scientific name of its own—*S. risoria*—is almost certainly the same species), which is at once recognizable by its pale buffish fawn or creamy colour in contrast to the greyish fawn with *blackish* primaries of the wild form. Some other ring-necked doves which are, or might be imported require more care. The Red-eyed Dove (*S. semitorquata*) has dark greyish-brown upper-parts, grey forehead, dull wine-red breast and belly and the tail patterned in blackish and grey with no white. The Cape Ring Dove (*S. capicola*) is very similar to *decaocto* in general appearance, but has a black streak from the corner of the mouth to the eye, as has the much smaller (smaller than a Turtle Dove) and more brightly coloured Vinaceous Dove (*S. vinacea*). The Mourning Ring Dove (*S. decipiens*) is darker than *decaocto,* being intermediate in colouration between it and *semitorquata* but with the tail pattern nearer to *decaocto*. However, this species seems to be very seldom imported and I have never seen one in this country, so there is probably not much need to worry about it. The female of the Red Ring Dove (*S. tranquebarica*) can at once be told by its small size, dull drab brown plumage and short tail. The male is dull pink with blue grey head and rump.

Behaviour of escaped birds.

Birds that are lost and starving may perch or seek food in unusual situations or show an indifference to the presence of man or other enemies. This behaviour is not, of itself, proof of their having escaped from captivity, since vagrant wild birds may be in like condition. Relative wildness or tameness towards man may not be a clue to origin. If a bird deliberately *tries to attract* a man's attention, going towards (even though it may be afraid to go very near) and looking eagerly into his face, perhaps uttering a begging call, then it is quite certain that it is accustomed to being fed. From its species and probable country of origin it will usually be possible to know whether it is likely to have been fed in a wild state by man, or whether such behaviour probably indicates an ex-captive. Lack of fear of man in a *healthy* bird of a species known to fear him in most of its range would point to its being an escape, but similar "tameness" in, say, a Laughing Dove (*Streptopelia senegalensis*) or a Waxwing (*Bombycilla garrulus*) would be of no significance. Fear of man is *of no value whatsoever* for an opposite conclusion. Even tame individuals may regain all their former timidity when they find themselves at liberty in a strange area. Contrary to popular opinion, birds bred in captivity are seldom tamer than wild-caught ones, unless they have been taken from their parents at an early age and reared by hand.

Escaped birds, particularly if in good health, tend to find and establish themselves in the nearest approach to their natural environment. This may seem self-evident but it needs emphasizing as I have twice heard experienced bird-watchers express surprise because escaped foreign bird were in the "right sort" of habitat. It would indeed be more strange if they did not seek out the "next best thing" to their normal biotope. Here of course one must try to take a literal "bird's eye view" and remember that the essential features of the habitat as they appeal to the bird may not be those that at first appear as such to the bird-watcher.

That a bird may turn up far from the nearest known dealer or bird-keeper is no proof of wild origin. Nor, as was implied in a discussion on the validity of a certain species, are bird-dealers and bird-keepers confined to London and eastern England. Random wanderings or attempts to perform their normal migratory movements may well be undertaken by escapes. A Barbary Dove that, after being at liberty for the whole four months of its life, vanished from my garden, was found alive and unharmed on the doorstep of the Tuskar Rock lighthouse in Ireland some two weeks after disappearing from Virginia Water, Surrey. Presumably it had crosed the Irish Sea unaided (since being hand-tame, as birds of this long domesticated species almost always are, it would almost certainly have gone to someone for food and been caught had it settled on board a ship) and had it not been wearing a name-and-address ring no one would have supposed it to have come from further than the nearest keeper of these birds in Ireland.

Condition of escaped birds.

There is a widespread opinion, fostered by many nature-journalists, that captive birds are invariably inferior to their free relatives in health and plumage condition. Unfortunately, whilst a gross libel on the majority of serious aviculturists, this is not without some foundation of truth. The proprietors of some pet-shops and some Zoological gardens appear unable or unwilling to give the birds in their charge proper food and individual attention. It is just from the unhappy results of such mismanagement that the general public, not unnaturally, form their opinion of birds in captivity. In the case of most species of birds that are commonly kept (the exceptions will be mentioned shortly) present-day knowledge of their requirements is such that it is quite possible for captive specimens to be fully equal in plumage and soft-part colouration to those at liberty. The fact that a bird is in perfect plumage cannot then, of itself, be any evidence against its having escaped.

On the other hand certain imperfections of plumage may point very strongly to recent captivity. Birds in cages, and to a lesser extent those in aviaries, are very apt to break their wing and tail quills. If a bird has *several* broken wing- and tail-feathers the odds are very strongly in favour of its being an escape. Of course, confinement for anything more than a few minutes in a trap may produce the same result. For this, apart from other reasons, the practice of some ringers, in the past at any rate, of leaving the first bird caught in a multiple potter trap as "bait" for Sparrowhawks (*Accipiter nisus*) is thoroughly reprehensible. There are two exceptions to the general rule that many broken wing- and tail-quills are a sign of the bird's having battered about in a cage. Firstly, under modern conditions hole-nesting birds may nest in sites where they break their wing quills getting to and from the nest. This occurs in my district with chimney-nesting Jackdaws (*Corvus monedula*), some of whom when feeding young are so impeded by their shortened wings that they can hardly fly. In these, however, the tail-feathers are seldom broken and their front claws are invariably worn down to the quick with the constant climbing up the chimney. Secondly, temporary starvation or some other physical disaster at the time of feather-growth may cause a "fretmark" or "hunger-bar" on the growing feathers (see Fig. 2). These are particularly common in the juvenile feathers of the larger species of nidiculous birds. Feathers are very liable to break at the fretmark. In the case of a juvenile

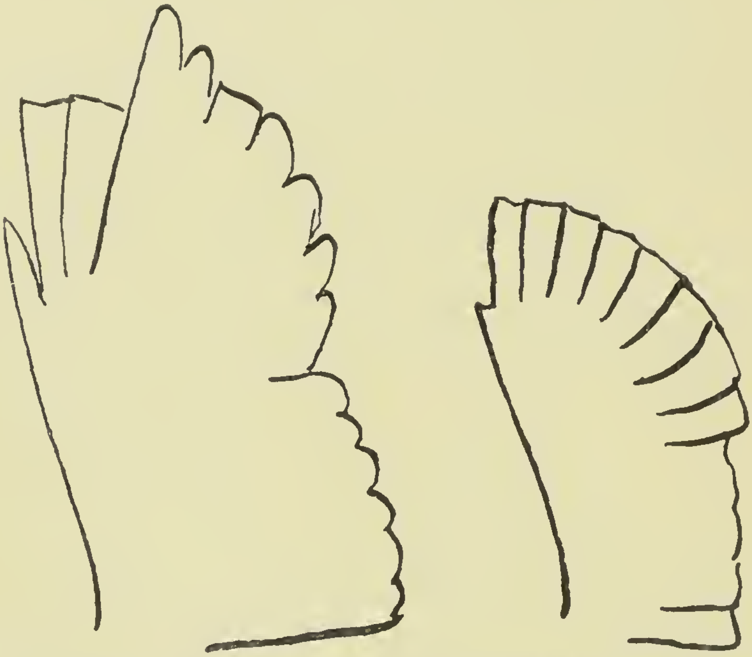


FIG. 2—TO SHOW DIFFERENCES IN FEATHER-BREAKAGE AS A RESULT OF CAPTIVITY (left) AND "FRETMARKING" (right)

Uneven breakage, as shown on the left, is typical of that found in caged birds; where "fretmarking" has occurred (for explanation see text), all the wing-quills are usually broken at the same point.

all the wing and tail quills will usually be fretmarked *at the same point.* The breakage of each feather renders its neighbours more vulnerable to injury and a badly fret-marked juvenile may, in after life, lose all its wing- and tail-quills through their breaking off at a fretmark. Birds that keep much to cover—such as Jays—may live in this condition for some time, but, since their foraging powers are severely restricted, they are likely to go from bad to worse in any subsequent moult. Such a condition can also arise in captivity and so is no indication either way. To sum up: If a bird has many broken wing- and tail-quills it is usually an ex-captive. If it has only one or two broken quills or if all or most of the wing- and tail-quills have broken *at the same point* and any that have not are fret-marked at this point the bird is just as likely to be truly wild.

Linnets (*Carduelis cannabina*), Redpolls (*Carduelis flammea*), crossbills (*Loxia* spp.) and rosefinches (*Carpodacus* and allied genera) usually lose their red colours after moulting in captivity (and captive-bred specimens seldom attain them), these being replaced by a dull golden tinge. The exact reasons for this are as yet obscure and further complicated by the fact that occasionally wild birds may be found of the typical ''captive'' colouration, that there are records of some captive birds showing the normal red colours, and that captive birds in their usually duller dress will breed readily and successfully. Lack of the normal red colour in an adult male of any species belonging to the above-mentioned groups would be strong corroborative evidence—though not in itself proof—of the bird being an ex-captive.

Plumage that is dirty or duller and/or paler than normal frequently results from improper conditions of captivity. It is of little positive value in this connection, however, since sickness, hunger or ill-health may induce a similar state in wild individuals. The same is true of abnormally pale soft-parts. This particularly seems due to bad feeding. Most people must have noticed how often gulls, and in other countries Black Kites (*Milvus migrans*), that are feeding principally on waste human food have much paler and dingier legs and bills than those of their species that are living on natural foods. Hawks and falcons in Zoos often have pale creamy legs that would be brilliant yellow in a well-fed wild specimen.

Gross overgrowth of claws and mandibles sometimes occurs in captive birds, often if they are confined in cages or aviaries with only hard floors and perches. This seems to occur only very rarely in truly wild birds (though overgrowth of the upper mandible is a common pathological condition in feral pigeons living in towns) and in the case of any bird showing it to a marked degree there would be an added reason for presuming it to be an escape unless there was some very strong contrary evidence.

THE ARRIVAL AND DISPERSAL OF REDWINGS AND FIELDFARES IN ESSEX IN OCTOBER 1955

By M. R. Chettleburgh and R. M. Larner

These notes are extracted from a summary of a short watch on visible migration at Bradwell, Essex, that took place from the afternoon of 22nd October 1955 to dusk on the 24th. Continuous observation in this time was interrupted only by meals and occasional drives of the Heligoland trap of Bradwell Observatory. Details of movement outside this period are compiled from the random observations of Messrs. A. Parker and Linnet. Watch was kept from three positions: in the vicinity of Tip Head on the southern shore of the River Blackwater; on the old R.A.F. pier off the Dengie Hundred; and on the wall south of the pier. The afternoon observations were mainly confined to the latter two positions. All places mentioned in the text are marked on Map 1, which also gives the directions of the main movements of the various species observed.

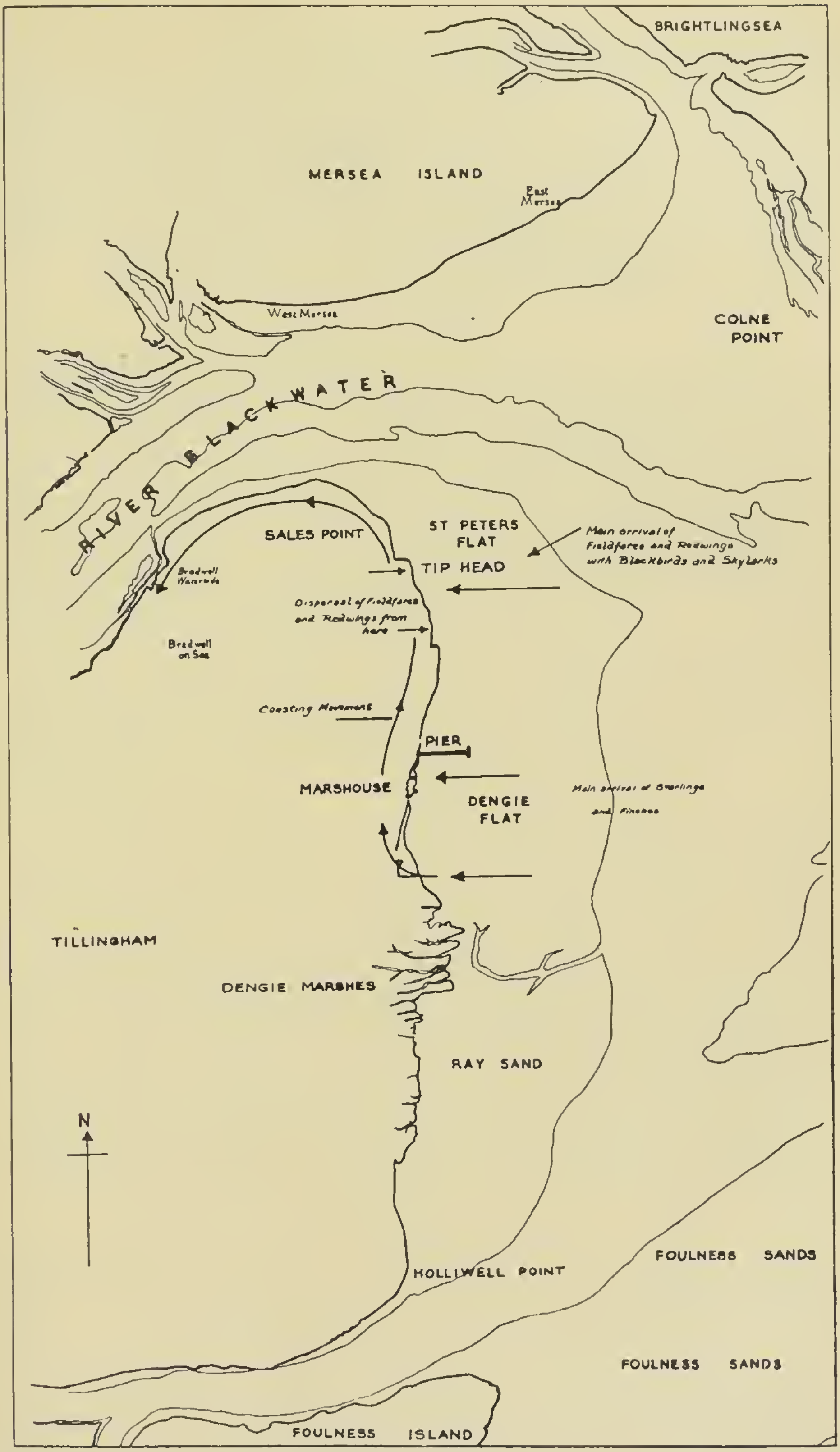
WEATHER

From 18th October until the 24th a spell of generally dull weather prevailed over Essex. Skies were almost continuously overcast and winds often brought rain. The worst weather occurred on the 21st. A daily record is set out below.

18th October: Dry with bright periods; light N.W. wind veering S.W.
19th October: Cloudy with continuous rain; wind fresh to strong, south-westerly.
20th October: Cloudy with rain or drizzle; light to moderate S.W. wind.
21st October: Cloudy with continuous rain; strong to gale N.N.E. wind. Off the Dutch and adjacent Continental coasts winds were light E.N.E.
22nd October: Cloudy with rain at first, brightening later; strong to gale N.N.E. wind. Off the Dutch and adjacent Continental coasts winds were light easterly.
23rd October: Cloudy with rain; winds variable, mainly N.E.
24th October: Dry with bright periods; fresh or light winds, mainly N.W.

GENERAL OBSERVATIONS

The decision to watch for visible migration was first made at Hainault some 30 miles from, and west of, the coast on the morning of 22nd October, when small parties of Fieldfares (*Turdus pilaris*), Redwings (*T. musicus*) and Starlings (*Sturnus vulgaris*) were seen passing due west. These small parties had not been noticed earlier in the week. Information received from Mr. Linnet, however, showed that a comparable movement at Bradwell was first recorded on 18th October. We were not able to ascertain to what extent migration took place on the 18th, 19th and 20th, although on the 21st Mr. Linnett saw vast flocks of birds, mainly finches, Starlings and Skylarks (*Alauda arvensis*), moving north up to Tip Head and Sales Point and then following the southern shore of the River Blackwater west into the country.



MAP 1—TO SHOW LOCALITIES REFERRED TO IN THE TEXT, AND THE DIRECTIONS OF THE MAIN MOVEMENTS OF REDWINGS (*Turdus musicus*), FIELDFARES (*T. pilaris*) AND OTHER BIRDS

On 22nd October migration was moderate. The 23rd October saw the peak of migration that was witnessed by the writers and on the 24th the number of birds passing had decreased slightly—still noticeable in the morning, although much less in the afternoon. In the time we watched the main passage of Starlings, Redwings and Fieldfares occurred on 23rd October, the main passage of finches and Blackbirds (*T. merula*) on the 24th.

In this short paper prominence is given to observations on Redwings and Fieldfares because very little seems to have been recorded on the visible migration of these two species.

REDWINGS

On 23rd October, the main arrival of Redwings occurred between 10.0 a.m. and 11.0 a.m., reaching a peak at 10.30 a.m., over 6,000 birds arriving during the day. All the Redwings seemed to arrive at Tip Head and the only one seen to arrive at Dengie was a solitary individual which came in low over the sea at 4.15 p.m. Redwings arrived at Tip Head singly and in flocks of up to 200, and immediately alighted on the beach and saltings where they swarmed like insects. They were extremely tired and invariably sat quiet for five minutes before hopping about slowly, feeding and preening. Occasionally, birds flew in over the saltings and alighted on or behind the wall, but none went right inland.

From time to time individual Redwings and small parties left or were disturbed from the beach and saltings and went over the wall. The spread inland therefore seemed a gradual process, with the majority of the Redwings arriving during that one hour but then taking some time to disperse. In this connection it is interesting to note that Redwings inland were by no means numerous and there were, in fact, only scattered individuals here and there, some of which may well have arrived earlier. In view of this and the fact that no Redwings followed the coastline as did Starlings, Skylarks and finches, it rather seems that, unlike the case of these species, dispersal takes place from the coast and the Redwings move inland as individuals and small bands rather than as the large flocks that arrive from the Continent.

On 24th October the only Redwings seen were an individual on the wall at Dengie in the afternoon and a flock of 20 in bushes near Tip Head, although they had been passing overhead in apparently small numbers on the night of the 23rd.

FIELDFARES

The peak period of arrival for Fieldfares on the 23rd was shortly before the Redwings. Flocks of anything from 5 to 50 birds arrived at Tip Head and there were a few small flocks at Dengie, the total at both places during the day being about 1,500.

The Fieldfares came in very low over the waves and some dropped onto the saltings. Most, however, went over the wall, often making for the nearest tall cover. No coasting was observed and dispersal seemed to be of a similar style to that of the Redwing. In the case of neither species did the flocks which arrived appear to keep together and move inland *en bloc,* as happened with Starlings and finches. However, a few small feeding and moving parties of Fieldfares (up to 30 birds apiece) were encountered inland, which may mean that some birds did disperse from the shore as a large party or on arriving did not stop there, though it was obvious that this did not apply to the majority. Here again, as with the Redwing, there appeared to be no coasting and birds seemed to pass directly and individually inland.

OTHER SPECIES

Blackbird.

Although no Blackbirds were seen arriving on the 23rd a small movement had obviously occurred, as was proved by single birds on the wall at Dengie and in the hedges in the St. Peters area. Passage on the 24th increased considerably and well over 100 birds must have arrived. They were common along the sea-walls and back-hedges and several single birds were seen to come off the sea, usually flying in fast and very low. Judging by the number of birds seen, most Blackbirds arrived before 7.0 a.m. and either alighted on the saltings or wall or made straight for the nearest tree or bush cover. Dispersal seemed to be for the individual along lines of hedges, etc. No large flocks were seen. It is interesting to note that on 23rd October the thrushes mainly arrived in the following order: Blackbird, Fieldfare, Redwing.

Mistle Thrush.

No noticeable passage of Mistle Thrushes (*T. viscivorus*) was recorded on the 23rd although on the 24th there were anything up to 10 birds around St. Peters chapel. One individual was seen to coast north and turn up the Blackwater.

Coasting of Starlings, Chaffinches and Skylarks, etc.

The arrival of Fieldfares and Redwings was accompanied by a fair migration of Starlings, Chaffinches (*Fringilla coelebs*), Skylarks and other birds. In two days over 10,000 Starlings, over 500 Skylarks and hundreds of Chaffinches, Linnets (*Carduelis cannabina*) and some Greenfinches (*Chloris chloris*) arrived. None of these species dispersed as did the winter thrushes; instead they swerved north and coasted in their respective flocks along the south shore of the River Blackwater and thus inland. None of these birds seemed unduly tired. Carrion Crows (*Corvus corone*), Woodpigeons (*Columba palumbus*) and Meadow Pipits (*Anthus pratensis*) all passed in fair quantities. The number of waders appeared to jump tremendously. Three Merlins (*Falco columbarius*), a few Kestrels (*F. tinnunculus*), three Swallows (*Hirundo rustica*), two martins (? species), a female Wheatear (*Oenanthe oenanthe*), a female Brambling (*F. montifringilla*) and three Sandwich Terns (*Sterna sandvicensis*) were other migrants noted.

PHOTOGRAPHIC STUDIES OF SOME LESS FAMILIAR BIRDS

LXXIII. BARRED WARBLER

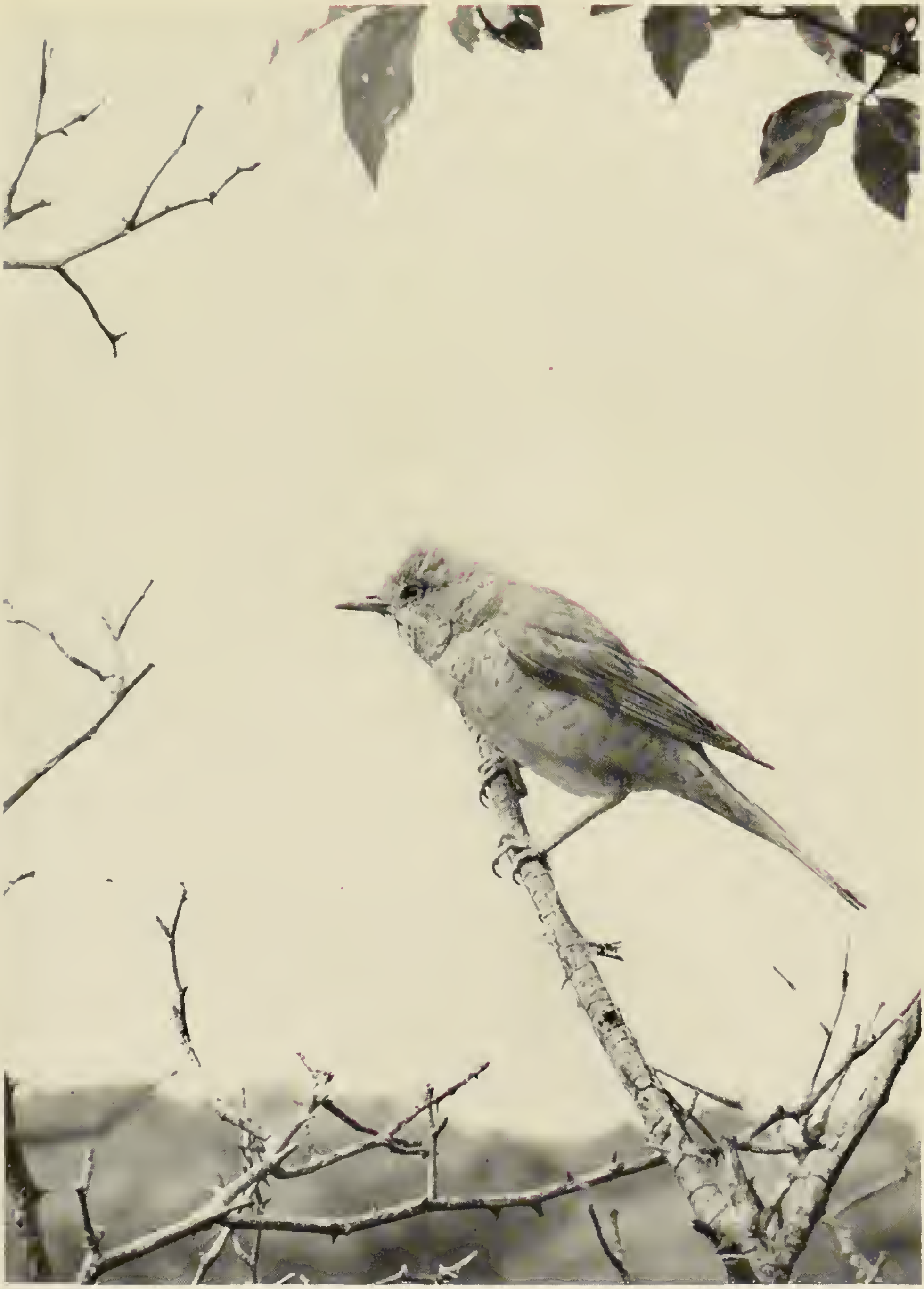
Photographed by P. O. SWANBERG

(Plates 45-52)

OF the rarer warblers the one which the observer in Britain is most likely to meet with sooner or later, somewhere on the East Coast, is the Barred Warbler (*Sylvia nisoria*), which now occurs with greater frequency than that other annually recorded autumn drift-migrant, the Yellow-browed Warbler (*Phylloscopus inornatus*). Thanks to the work of the bird observatories it is now realised that every year a small number of Barred Warblers appear on the East Coast of Scotland and England. During the five years 1950-54 no less than 34 were trapped and ringed, 16 of them in the last of these years. Each year nearly every East Coast observatory records at least one Barred Warbler and England now has about twice as many records as the figure (50) quoted in *The Handbook*. Mr. Swanberg's excellent photographs, which are more than equal to the high standard we have come to expect of him, were taken in south-eastern Scania, S. Sweden. Sweden and Denmark are the north-western limits of the breeding-range of this species which is confined to the eastern half of Europe and the western half of Asia, mainly between 40°N. and 60°N., extending from Denmark, Germany and north-eastern Italy to eastern Turkestan, the Kirghiz Steppes and the southernmost part of the Yenisei; in this range being absent apparently only from an area east of the Caspian Sea.

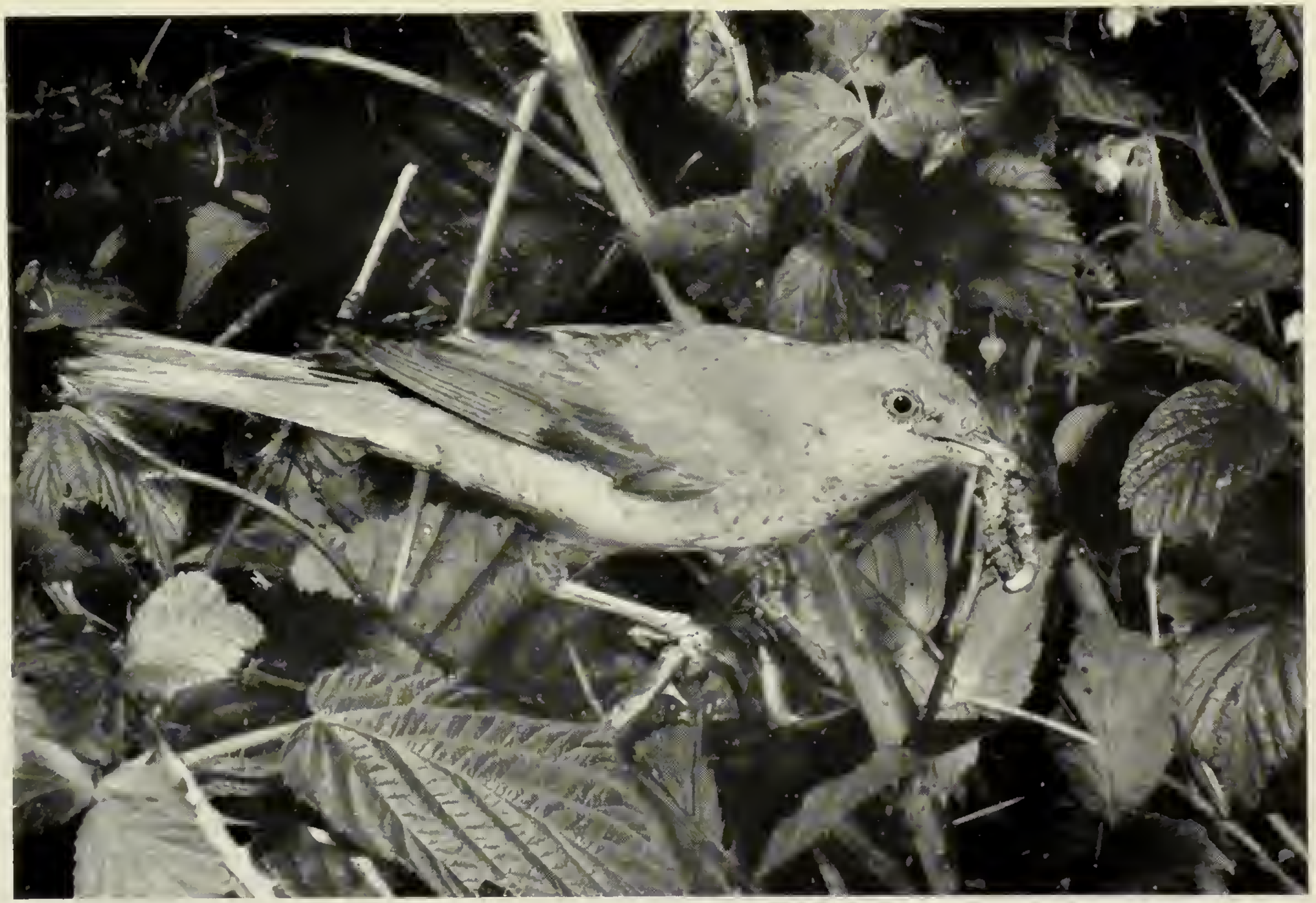
The male Barred Warbler is a uniform ash-grey above, the female a browner grey, both being darker and browner on the wings. All these plates give a good idea of the characteristically marked under-parts from which the bird gets its name, but plate 49 perhaps does so better than any other: the ground-colour below is whitish, but in summer both sexes are strikingly marked (except on the centre of the breast and belly) with crescent-shaped barrings, heavier and closer together on the sides of the breast, lighter on the flanks; the female is usually less distinctly marked than the male. Unfortunately, this barring is often of little use as a field-character in this country, because the majority of the birds recorded are immatures, which are more buff below and have little or no barring (except perhaps some at the sides of the breast and flanks), while the adults, by then in winter plumage, have the barring only on the sides. Another striking character of this bird, which shows up well in plates 46-50, is the staring yellow eye, quite unlike that of any other British-recorded species

NATURAL HISTORY



P. O. Swanberg

BARRED WARBLER (*Sylvia nisoria*): SWEDEN, JUNE 1955
This is the male, on his favourite song-post. Though a very skulking species, it usually delivers its song from a conspicuous perch, or in a dancing display-flight rather like that of the Whitethroat (*S. communis*). This photograph gives a good impression of the heavy, long-tailed silhouette, with the thick legs, large feet and stout bill (see page 355).



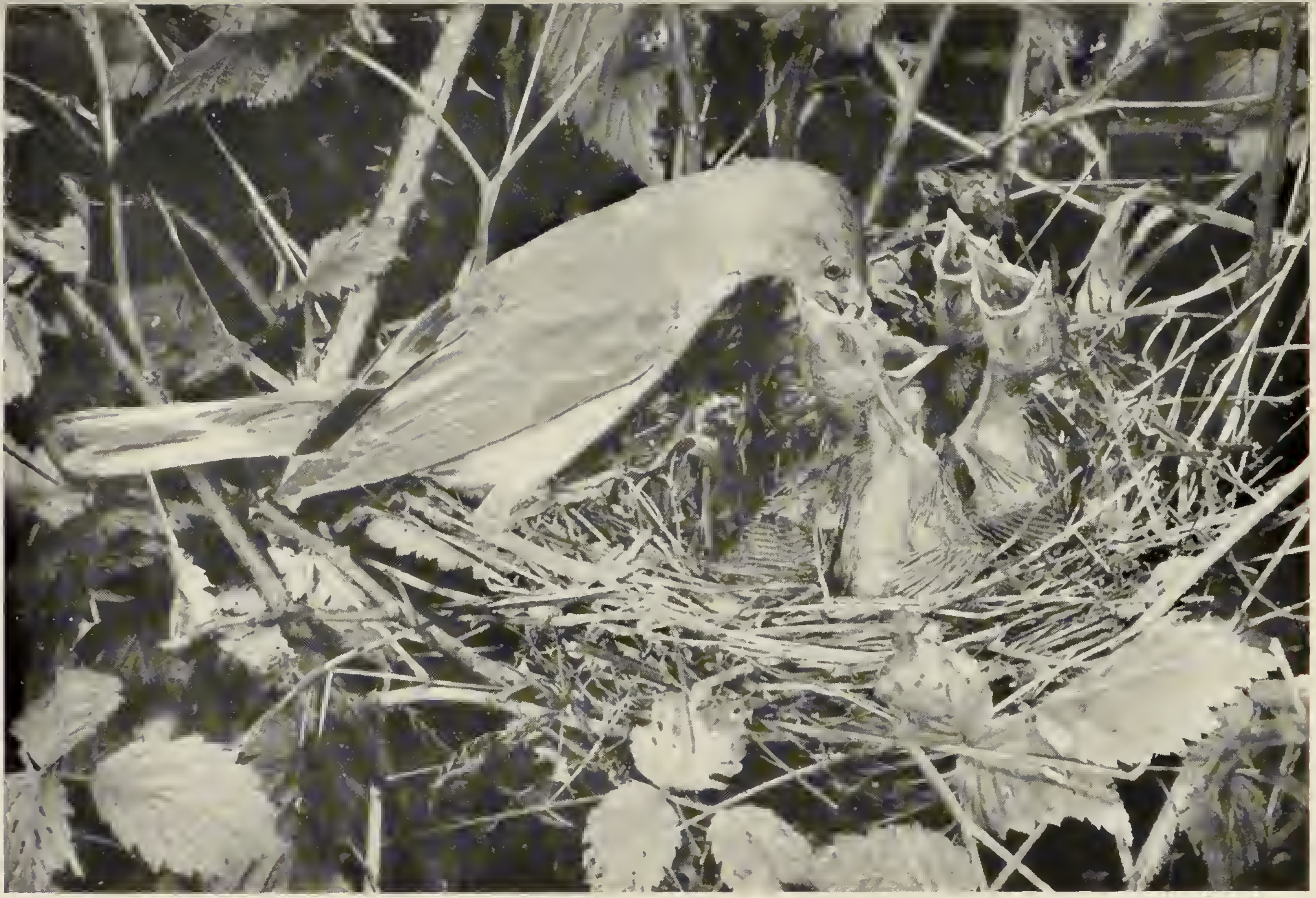
P. O. Swanberg

BARRED WARBLER (*Sylvia nisoria*): SWEDEN, JUNE 1955

The male carrying a caterpillar to the nest: the species is almost entirely insectivorous, so far as is known, except that migrants in autumn feed to a certain extent on berries; this particular pair seemed to be feeding [illegible] bill, the stout legs and the staring, yellow eye

PLATE 47

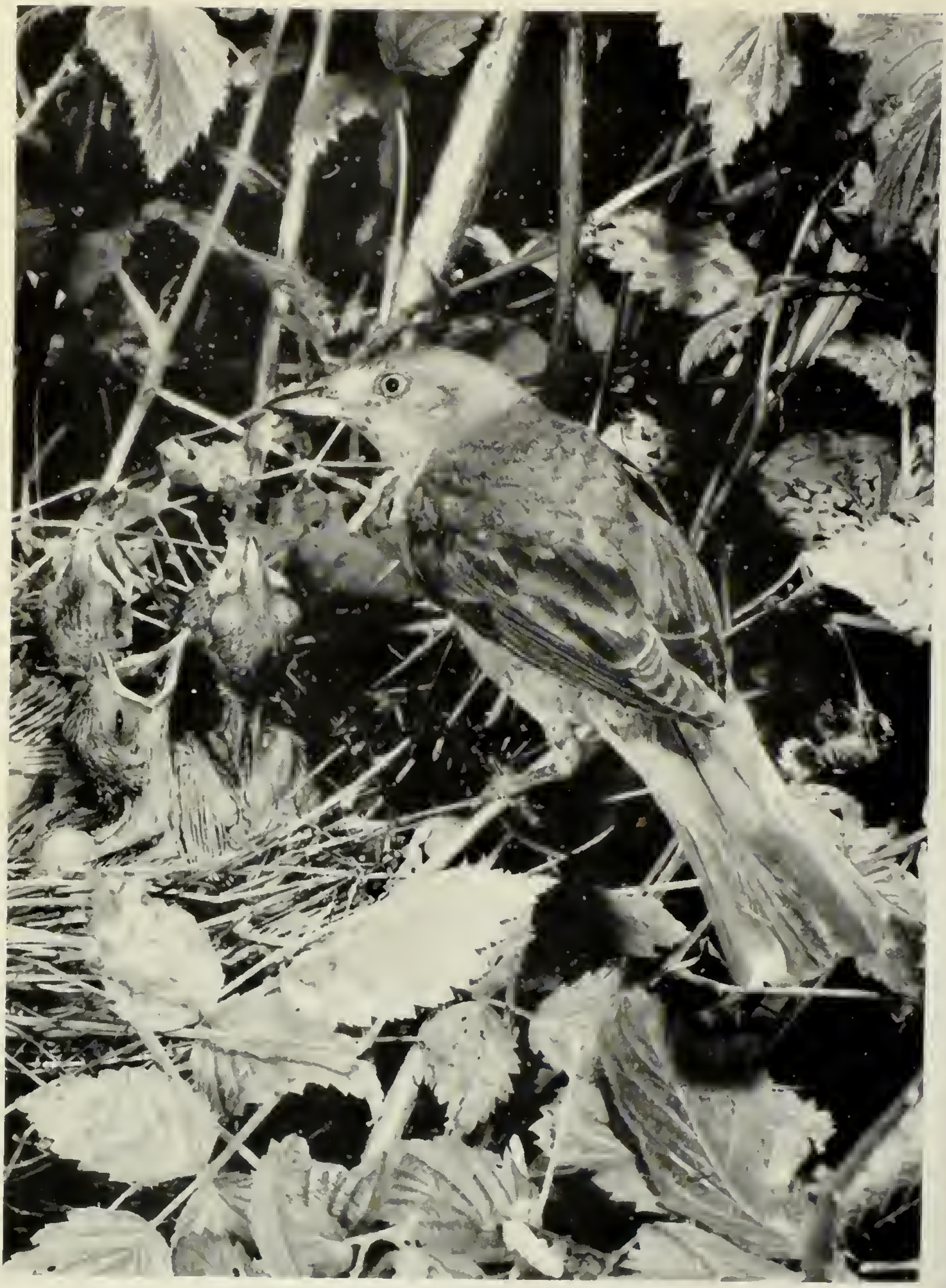
ATURAL HISTOR



P. O. Swanberg

BARRED WARBLER (*Sylvia nisoria*): SWEDEN, JUNE 1955

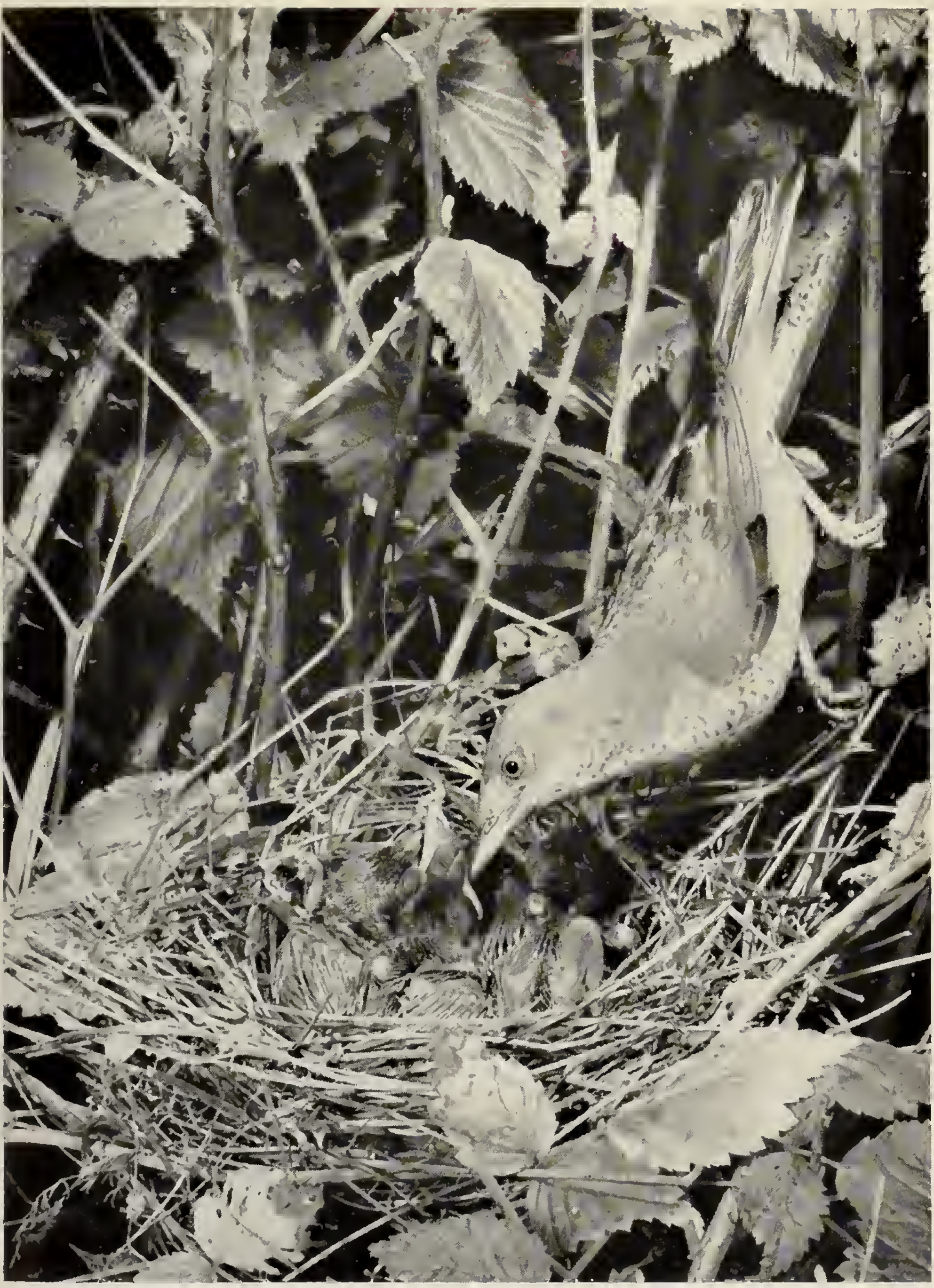
The male is ash-grey above, the female browner. Below, both are whitish, strikingly marked—except on the centre of the breast and belly—with crescent-shaped barrings, heavier and closer together on the breast, lighter on the sides and flanks: these markings can be seen in all these plates. In winter the barring is reduced and confined to the sides (see page 354).



P. O. Swanberg

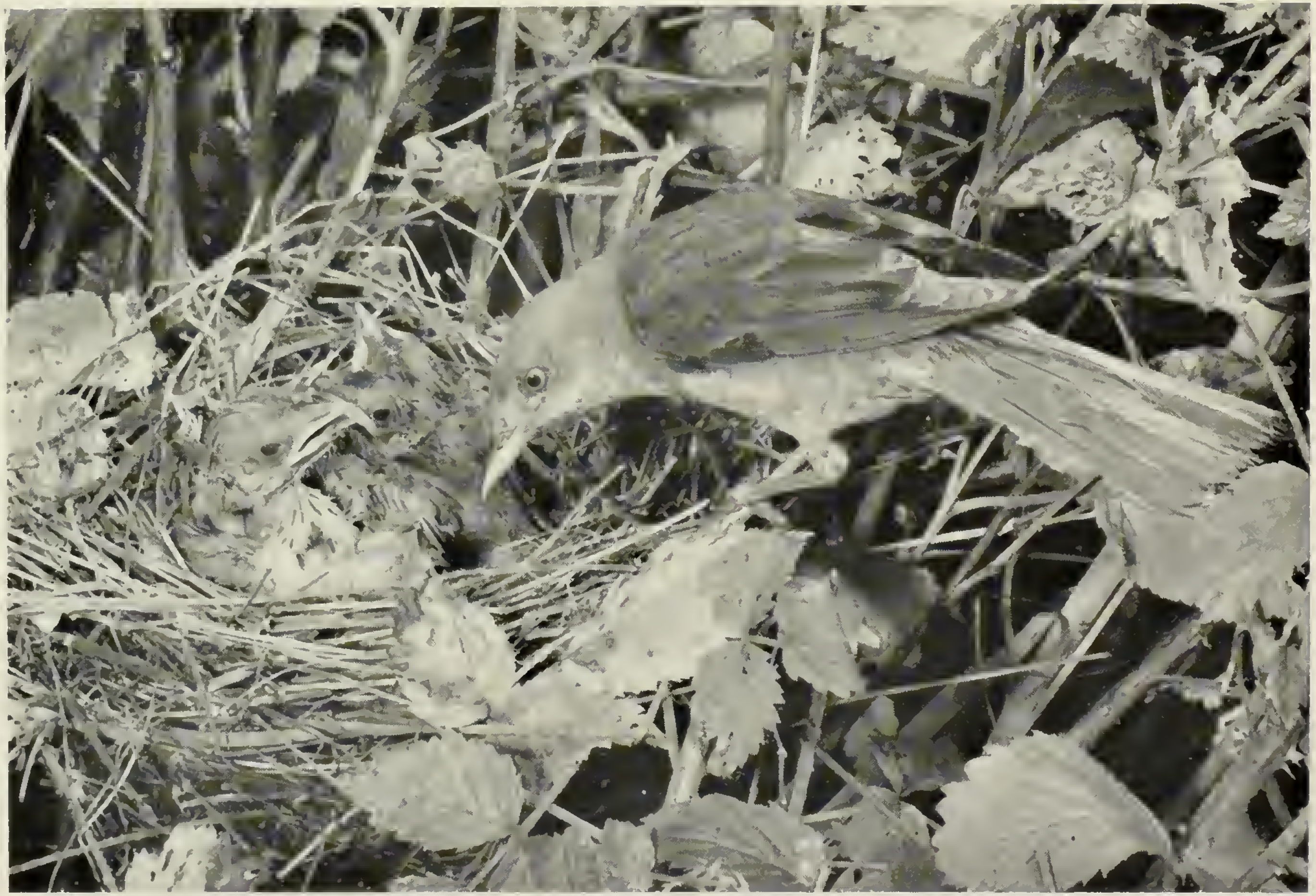
Barred Warbler (*Sylvia nisoria*): Sweden, June 1955
When the bird is in fresh plumage, pale tips to the wing-coverts sometimes form two light and rather ill-defined bars on the wings, but this is very variable and in any case they are usually lost later on through abrasion. There is no sign of them on this bird which is in very worn plumage, as is shown by the state of the tail.

TURAL HI



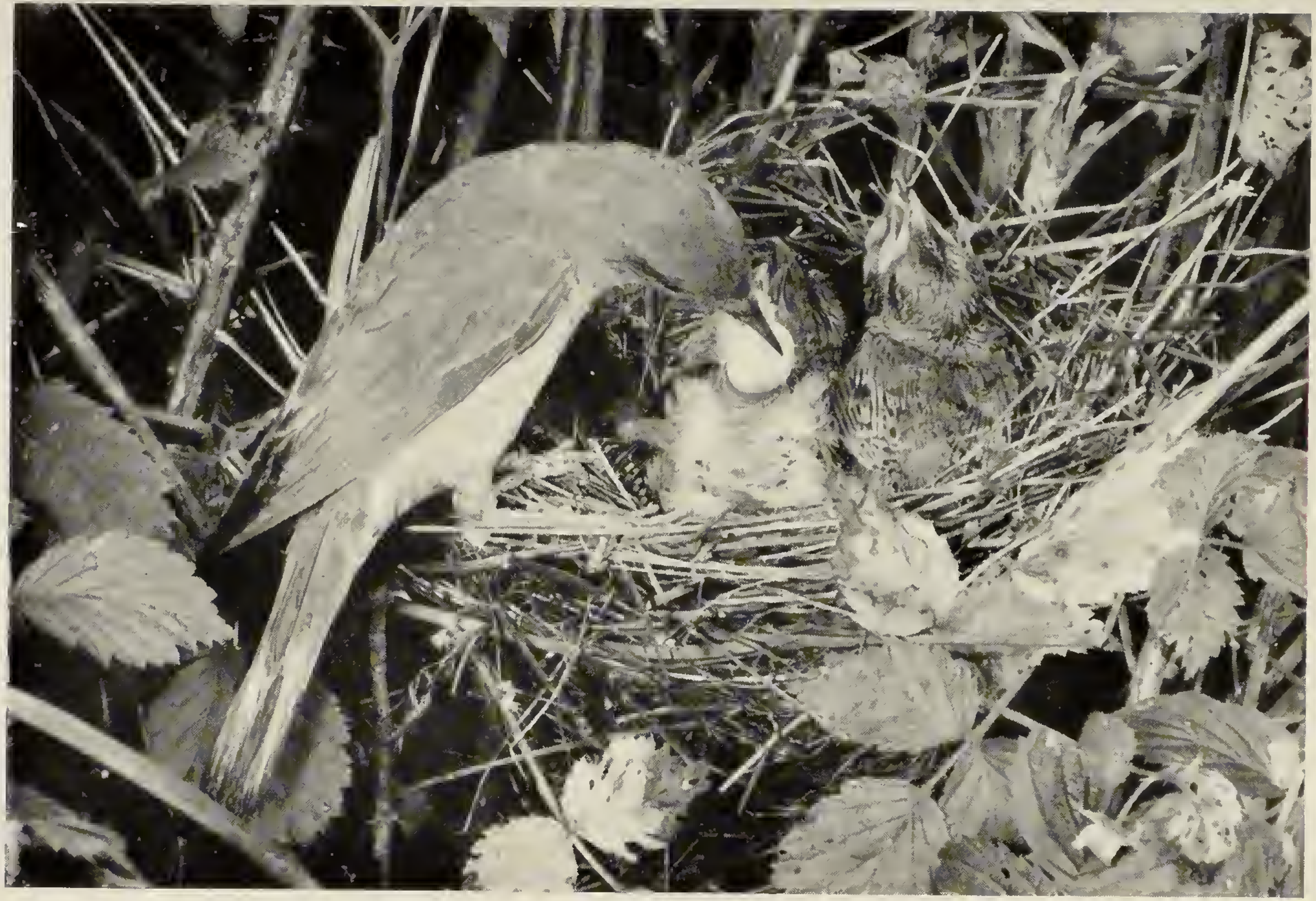
P. O. Swanberg

BARRED WARBLER (*Sylvia nisoria*): SWEDEN, JUNE 1955
The nature of the crescent-shaped barring is better shown here than in any of the others. This plate, the previous one and the next two serve to illustrate a sequence of behaviour well known to anyone who has watched small Passerines at the nest. Having fed the young, the bird looks around (plate 48) and then, as here, moves about the nest with a fixed stare waiting for the young to defaecate.



P. O. Swanberg

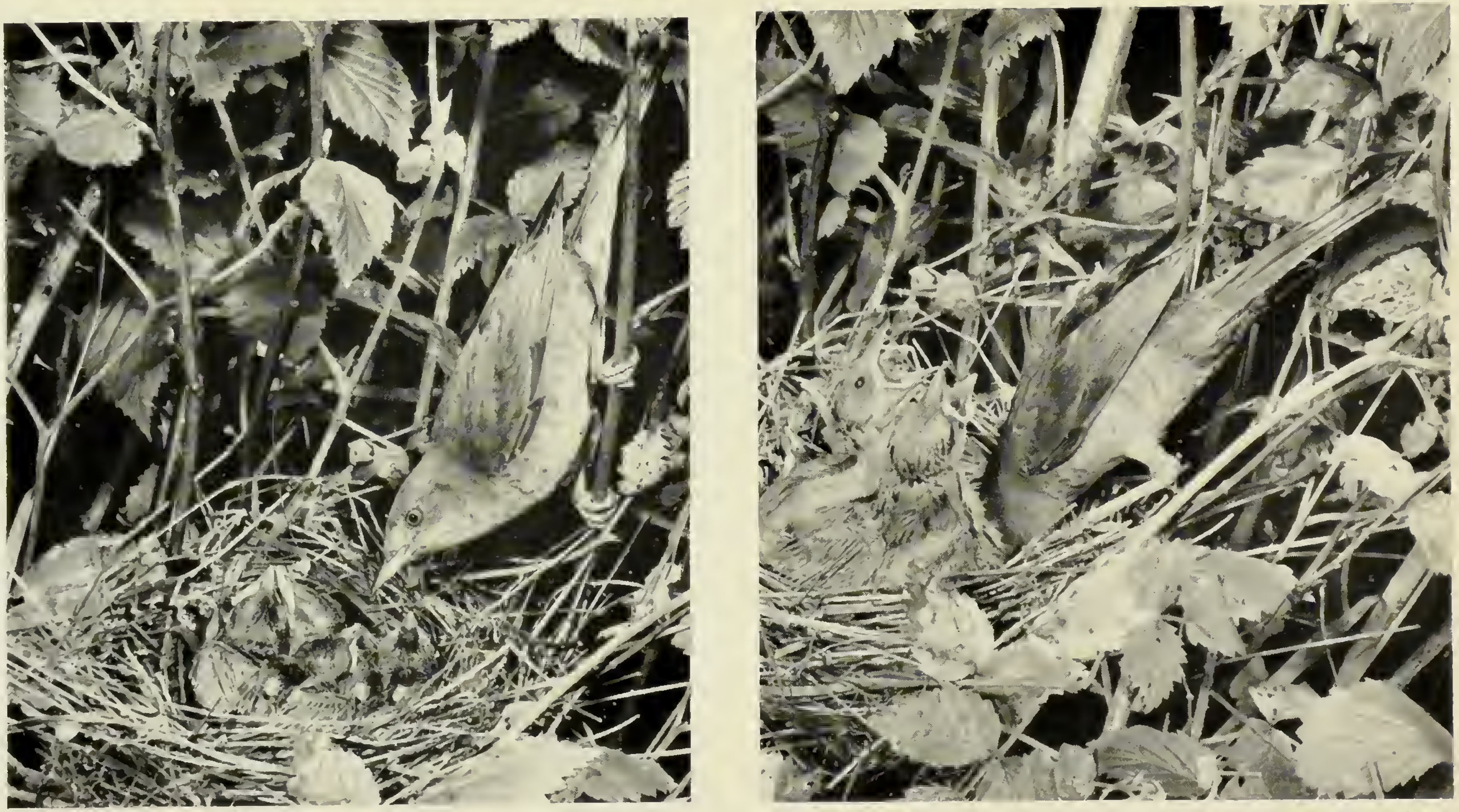
BARRED WARBLER (*Sylvia nisoria*): SWEDEN, JUNE 1955
Another shot of the peculiarly intense stare adopted by Passerines waiting for the young to defaecate: the bird moves around the nest, pausing and watching, occasionally prodding, for anything up to half a minute.



P. O. Swanberg

BARRED WARBLER (*Sylvia nisoria*): SWEDEN, JUNE 1955

As the chick backs up to the edge of the nest, the adult snaps up the faecal sac and swallows or flies off with it. The nest is usually in thorn or brambles, 1-6 feet above the ground, rather roughly and untidily constructed of bents and grasses, lined with finer grasses and hair, the result being typical of the genus (see page 355).



P. O. Swanberg

BARRED WARBLER (*Sylvia nisoria*): SWEDEN, JUNE 1955

The left again gives a good idea of the heavy bill and the rather thick-looking legs and feet. In the right is illustrated another continually repeated activity of nesting Passerines—the rooting in the bottom of the nest which is presumably a search for parasites and dropped particles of food, but which also serves to loosen except perhaps the Orphean Warbler (*Sylvia hortensis*), which has a paler yellow, almost white, iris; again, however, this is of no assistance in the identification of the immature bird which has a dark greyish-brown iris. The young Orphean and the Garden Warbler (*S. borin*) are probably the species which the Barred Warbler most resembles, but it is much more noticeably long-tailed than either, it lacks the rounded head of both, and is at the same time generally greyer in colour and heavier in appearance, with noticeably stout legs (plates 45-46) and bill (plates 45-48), while pale tips to the primaries and secondaries show up in flight. The adult Barred Warbler in fresh plumage often has pale tips to the wing-coverts as well (to a very variable extent), thus forming two irregular whitish bars, but as can be seen in the worn-plumaged bird that appears in these photographs, these can easily be lost through abrasion.

The Barred Warbler is a rather skulking bird of hedges, thorns and brambles, building its nest (plates 47-52) chiefly in such places between a foot above the ground and head height. The nest is typical of the genus, a little untidily constructed of grasses and bents, lined with finer grasses, hair and rootlets. The eggs, usually five in number though the clutch varies from 3 to 6, are, however, rather characteristic, being faintly speckled with grey on a grey ground. Though the bird is usually secretive, it often delivers its not unattractive song, rather like that of the Garden Warbler though shorter and quicker, from a conspicuous perch (plate 45) or in a dancing, Whitethroat-like song-flight.

I. J. F.-L.

REVIEWS

LEARNING AND INSTINCT IN ANIMALS. By W. H. THORPE, F.R.S. (*Methuen*, London, 1956). 493 pages; 70 figs.; 9 plates. 55s.

THIS extremely important book by the President of the B.O.U. is intended mainly for zoologists and is almost certainly too specialized, technical and difficult for the general bird-watcher. It is a much needed and timely synthesis of the findings of European observers on wild and captive animals, especially birds, and of American laboratory experiments on rats, etc., in mazes and with puzzles. The book is primarily concerned with learning, using this term in the broadest sense, while instinct is discussed chiefly as a background by which to assess learning. It therefore follows on from N. Tinbergen's *Study of Instinct* (1951), but whereas the latter included much valuable information from field-ornithologists, the research on learning, even that on wild birds, has been mainly by trained zoologists. The book is written in language to which the zoologist (but not the general reader) is accustomed, and assumes a not inconsiderable knowledge of zoological and psychological terms. The first part is theoretical, and probes more deeply than N. Tinbergen's book already mentioned, but at the expense of lucidity. The various theories of instinct and learning are discussed with sound, critical, sympathetic and mature judgement, and the author raises (if he does not solve) the complex philosophical problems involved in "purposiveness" in behaviour, and the relationship of subjective to objective knowledge.

The remaining two-thirds of the book is a full survey of learning behaviour in the animal kingdom, birds providing nearly half of the information. This section the general ornithologist will find easier, though much of it will be outside his common experiences. The subjects discussed include habituation in the mobbing of owl models; the relationship between trial-and-error learning and instinctive maturation in feeding and flight; play, which now seems well established in a number of birds; homing; the use of tools, including a study of tits pulling up food on the end of a string; the concept of number (Koehler's experiments); imprinting; song; individual recognition; tameness. Much of this materal appeared previously in the *Ibis* (vol. 93, pp. 1-52 and 252-296).

To conclude, this comprehensive, wise and well-balanced, but technical, book should have a great influence on the directions which future research on behaviour will take. D.L.

TRAVELS AND TRADITIONS OF WATERFOWL. By H. ALBERT HOCHBAUM. (*The University of Minnesota Press*, Minneapolis, 1955). 301 pages; 4 tables; 26 figures and 49 illustrations in the text.

MR. HOCHBAUM is a large man, an artist, a hunter, a scientist and a humanist. His book is a reflective one, written slowly and best read ruminatively, too. The greater part of its material is a skilful digest of other people's observations and experiments on the problems of migration and on the nature of a bird's world. The peculiar merit of the book lies in its persistent development of the simple but neglected notion that migration is something that birds *do*, more impressive to the human observer than most of their doings, but indivisible from them, unless you prefer mystery to understanding.

The book begins at the back-door, with the first swans of spring. Mr. Hochbaum makes frequent use of scene-setting. understandably, since his home is in the famous Delta Marsh of Manitoba. He practises this risky technique so well that neither "purple" nor bathos obtrude. The opening descriptions and most of the personal observations in the book are concerned with the local movements, the daily rounds, of ducks. The experienced wildfowler may be inclined to dismiss this as trival familiar stuff. But can such a chronicle be found elsewhere, written down and then interpreted so thoroughly? It is refreshing to find a wildfowler who realises the value of lore as a foundation for systematic inquiry.

From the five chapters concerned with the ways in which a bird's world must resemble and differ from ours, as a result of differences in equipment and functioning, two discussions may be chosen as of particular interest. First, the account of the language of waterfowl. Though this has not the richness of human speech, it is wonderfully complete, enabling the individual to proclaim its identity and location, the situation (presence of food, alarm, and so on) and its condition relative to the social groups of the various times of year. Second, the chapter on the bird's knowledge of its aerial environment. This includes an eleven-page account of experiments with blind-folded birds tossed into the air, not previously reported in full. Hooded birds proved unable to orient to the wind, although they could remain aloft.

Seven chapters are devoted to migration. Most of the evidence is borrowed and much deals with birds other than waterfowl. In autumn waterfowl in central Canada "select anticyclonic weather for the start of their mass migrations, but . . . the weather is not in itself the impetus". This anticyclonic weather produces winds from the north-west and the standard direction of the migration is south-east. In spring south wind and rising temperature mark the onset of the heaviest migrations. The importance of the guiding influence of older birds on inexperienced youngsters making their first autumn migration is stressed. In "The Dimensions of Travel" there is a most illuminating discussion of the problem of migration in terms of distance and time-in-space, height and breadth of the field of vision. This gains greatly from analogy with human capacity.

A chapter on magnetic and radio fields includes a report on some experiments in directing radar beams at flocks of ducks. Non-cooperation by the ducks reduced the scale of the experiments, but it seemed that ducks responded to a first encounter with a radar beam, though only if they were flying towards its source. The disorienting effect was momentary, and comparable with that produced by the blast of a shotgun.

The four chapters on tradition are concerned with formulating problems rather than solving them, but include a variety of stimulating observations. Dabbling ducks are quicker pioneers than diving ducks, while Canada Geese are reluctant pioneers (as is obvious in Britain). Young birds are largely responsible for pioneering, while old ones maintain continuity with the past. It is sad as well as surprising that we in Europe have allowed the Americans to take the lead in studying the importance of tradition.

The final chapter, "Broken Traditions", is of the first importance to everyone concerned with the conservation of waterfowl. It deals with the effects of the loss of breeding places due to changes in human land-use and with the destructive consequences of over-shooting of local populations. Good duck habitat destroyed by conflicting economic interests can be restored (as is now beginning to happen in parts of America), and places depopulated by over-shooting can be restocked. But restoration is slow, expensive and uncertain. The aim must be to make restoration unnecessary, by fighting to maintain the traditions that are still alive.

Mr. Hochbaum as illustrator is no less successful than as author. One's main complaint with the delightful drawings interspersed within the text is that they divide the attention. The author will keep the affections of many by his full acknowledgement of indebtedness. It is to be hoped that the publication of his book in Minneapolis will not prevent his gaining the attention of a British audience too. H.B.

THE BIRDS OF LINCOLNSHIRE. By A. E. Smith and R. K. Cornwallis. (*Lincolnshire Naturalists' Union,* Lincoln, 1955). 136 pages; 4 photographic plates; several maps.

Lincolnshire ornithologists are indeed fortunate in having a most competant piece of work available to them. Paper-backed, it is modestly presented as Brochure No. 2 in a series on the county's natural history, published by the Lincolnshire Naturalists' Union, but it is better value than many a more elaborately produced book. The illustrations are well-chosen, and a number of maps have been specially prepared: there is a folding map showing some of the present day features of the county which influence the distribution of birds, map of the principal bird habitats 200 years ago which shows up the vast changes which have occurred, maps showing breeding density of Rooks and breeding sites of Great Crested Grebes and Herons, and maps indicating directions of autumn migration on the Lincolnshire coast, and overseas movements of some ringed birds. The text is intelligently and clearly written. The opening chapter describes the county and indicates the groups of species which are to be found in the different types of habitat. In dealing with the profound changes which have occurred in the past two centuries there are some fascinating glimpses of the county as it was in its former more natural state before the fens were completely drained or the wolds and heaths enclosed. Changes are, of course, continuing; it is the recent growth of the sea-side resorts and the advent of the motor-car which have most seriously affected the birds of the coast. A chapter is devoted to Lincolnshire ornithology and to the persons and institutions which have contributed to it. One of the most recent and important of these is of course the Gibraltar Point Bird Observatory. The observatory has been concerned chiefly with migration, and this is the subject of another chapter. In autumn there is an important movement from north to south, especially on the coast; another, equally important, from east to west, coming in from the North Sea and even turning north-west up the Humber. Spring migration is far less spectacular and has the surprising feature that at Gibraltar Point pasage follows the same direction as in autumn, namely from north following the coastline south and then south-west.

The remaining two-thirds of the book are occupied by a list of the birds of the county, arranged in the order of the *B.O.U. Check-List* of 1952, but with English names in the main following *British Birds* usage. It totals 275 species of which 101 breed regularly. Several records accepted by earlier workers in the county are here square-bracketed, one of these being of a Great Reed Warbler heard by Cordeaux and included in *The Handbook*. On the other hand the Red-flanked Bluetail of 1903 (*antea*, vol. xlvii, pp. 28-30) is accepted without any reservation. Some clutches of Kentish Plovers' eggs were taken at Humberston early this century; however, the birds themselves were apparently not seen, and it might be advisable to examine the case further before accepting it finally. In the case of the Great Crested Grebe it is perhaps worth pointing out that the absence of records in recent years for some of the waters occupied in 1931 is likely to be due as much to lack of observers as to lack of grebes; thus for Revesby, a reservoir difficult of access, no records were available from 1931 to 1953, which is the last year covered by the list, but a number of pairs were found still to be breeding there in 1955. P.A.D.H.

FROM BLOSSOM TIME TO AUTUMN FROST. By ISTVAN HOMOKI-NAGY. (*Corvina*, Budapest, 1955). 91 pages; 191 plates (159 in monochrome, 32 in colour).

DR. HOMOKI-NAGY'S book takes its not very explanatory title from the film for which the author was awarded a first prize at the Venice Film Festival, and its contents are the story of the making of that, and other, nature films. The text, in fact, is little more than an elaborate film commentary, and it is to be regretted that it contains so very little of interest to the ornithologist, especially as the author has devoted whole films to such little-known species as the Saker and Red-footed Falcons. Instead, it describes the difficulties and problems of making a full-length nature-film—nest-finding, hide-building and shy subjects, and then proceeds to a shot by shot account of each film. Indeed the reader, learning the size and organisation of the author's expeditions working on these films may justifiably wonder how the lone amateur ever manages to produce anything worth seeing, for clearly in the bringing of the Hollywood technique to nature-filming, even Mr. Walt Disney has nothing on Dr. Homoki-Nagy and the Hungarian Documentary and News Film Studio.

The text, therefore, is frankly disappointing, being intended only as an additional commentary for the film-going public. The numerous plates, however, cannot fail to appeal to those interested in nature-photography. It is a fact, and not insular pride, that the

British bird-photographers are ahead of the world in the technique of bird-portraiture, but, with some notable exceptions, they have not equally excelled in portraying birds in action. Above all, in illustrating their books, they have too often filled their pages with "studio portraits", but neglected to give adequate space to the general picture—habitats, birds in flight and away from the nest, etc. Often this has been forced on them by publishers' needs for economy in the number of plates. Nevertheless, Continental books have always stressed this point, and have subordinated technical excellence in favour of what ought to be called "general illustrative interest".

Dr. Homoki-Nagy's book is a first class example of this point. The illustrations, both in colour and in monochrome, are of great variety, even if they are of uneven merit. It is true that many are of captive or controlled birds, but the object—to appeal dramatically to the eye and to tell a story—is certainly achieved. At times, as for instance in the colour plate of a Booted Eagle standing on a cock Pheasant against a background of bright blue, the artificiality is a bit too much of a good thing—but it must be remembered that this is the technique of the public cinema. Such colourful shots are more than compensated for by plates like that of a Hoopoe's crest against the light, or of a close-up of a Bee-eater's head. The monochrome plates of birds of prey attacking and striking quarry in mid-air are outstanding, and it is of little matter that they are tame birds trained for hawking. Especial mention must be made of the colour plates of Roller and Syrian Woodpecker, but the monochrome pictures of Red-footed and Saker Falcons, although unique, leave much to be desired. Brief mention must also be made of the excellent long series of Hungarian mammals.

In short, this is not a book to read: it is an admirable album of photographs. G.K.Y.

THE BIRDS OF THE BELGIAN CONGO. By James P. Chapin. (*American Museum of Natural History*, New York). Part 3 (1953); Part 4 (1954).

These last two volumes complete the great task which the author set himself many years ago, the first part having been published in 1932.

The total number of species in the Congo amount to about 1,077, or approximately one eighth of the world total. Their treatment here includes a brief key to species for museum use, but otherwise there is generally little description of the bird itslf. World distribution is indicated for each species and subspecies treated, with, of course, details of Congo distribution. There is also information on Congo habitat, habits, voice and breeding. Readers in this country will naturally be mainly interested in the accounts of birds on the British List. Contrary to *The Handbook*, the Sedge

Warbler is said to be usually silent in winter-quarters here. Some idea is given of the relative abundance and habitat preferences of the races of *flava* wagtails. It seems surprising that Swallows are found as much in woodland and forest clearings as in savannas; a few individuals have summered. Red-backed Shrikes do not impale prey on thorns in the Congo. In all accounts of European winter visitors some information is given on dates of arrival and departure: thus the Garden Warbler arrives as early as 20th September and remains at least till late April.

Each volume includes 30 or 40 line drawings in the text, and a dozen or two plates of photographs. P.A.D.H.

LOVE LIFE OF THE BIRDS. By CARLOS SELVA ANDRADE. Translated from the Spanish by HERBERT M. CLARK. Illustrated by AXEL AMUCHASTEGUI. (*Codex Editors,* Sarandi 328, Buenos Aires, 1952). Sole distributors in Great Britain and Eire, W. Heffer and Sons, Ltd., Cambridge. £3 3s.

THE dust cover of this handsomely produced volume states that it is "written with masterly elegance in the tradition of Fabre and Maeterlinck", but although there is plenty of romanticism the reader will not find in it any of the careful first-hand observation associated with the name of the French entomologist. The style is florid and anthropomorphic. We read of birds being "feathered Don Juans" and making "lascivious demonstrations"—as if Dante, over six centuries ago, had not shown how misleading are such ways of thought. Rhetorical questions and facetious remarks abound: "What hidden motives cause the parrots to imitate the despairing fidelity of the lovers of Teruel, while the ravens sing 'The Merry Widow'? Why does the ostrich behave like the Archbishop of Canterbury; why is the stork more monogamous than Disraeli, and why do the Troglodytes get more divorces than Polà Negri?" The book seems to belong to an earlier generation. The large format, decorative coloured plates, anecdotal treatment and often out-of-date references recall Edwardian, if not Victorian, times. The translation is not always felicitous. Mention is made of "the English marsh wren", "the woodcock" and "the royal chaffinch", but the species concerned are the Marsh Warbler, the Capercaillie and the Bullfinch. There are some remarkable statements, as, for example, that falcons "can live in conjugal harmony for the incredible period of 160 years".

This book gives in popular form some idea of the wide variety and great interest of bird posturings, though it may bewilder the unsophisticated and exasperate scientific readers in English-speaking lands. Its publication in the Argentine is a welcome indication of an increasing interest in bird behaviour in a country once so regardless of the beauty of birds that W. H. Hudson congratulated himself that he would never return there. It may be that where Spanish is spoken this volume will stimulate delight in birds, and if so, the author's ambition "to be the intermediary between the men of science and the ordinary reader" will be, to some extent, fulfilled. E.A.A.

LOCAL REPORT REVIEWS

THE KENT BIRD REPORT, Nos. 2 (1953) and 3 (1954). Editor: E. H. Gillham, 99, Hillcrest Road, Orpington. Obtainable from G. R. Shannon, Hon. Gen. Sec. Kent Ornithological Society, Selbourne, Cannongate Road, Hythe. 50 pages each. 2s. 6d. each.

THE second and third numbers of this annual publication of the Kent Ornithological Society maintain the standard set by the first. Each contains about 30 pages of species records which are arranged in the order of the *B.O.U. Check-List* "subject to the changes decided upon by the Editors of *British Birds* and notified in that journal". In each there is a report of the Dungeness Bird Observatory and one from an interesting private ringing station at Sandwich Bay. The area covered is stated to be the whole of Kent excluding the part covered by the London Natural History Society. Strangely enough, however, amongst the records given are several from the Royal Sovereign Lightship which is 8½ miles south of Bexhill and the Sussex coast and over 20 miles from the nearest part of Kent. It is also to be noted that records of breeding Little Ringed Plovers are given for "just outside boundary with L.N.H.S. area". It is stated that the Society's requirements for accepting sight records of rarities will be no less than the standard laid down in *British Birds* (*antea,* vol. xlv, pp. 1-2).

No. 2 (1953).

Over 200 observers contributed records to this Report. Among the more interesting items are the following. Six Black-throated Divers but only one Great Northern Diver. A Leach's Petrel and a Storm Petrel, both caught at Dungeness Lighthouse in December. Manx Shearwaters (5 records in all) in May, August and September. A Fulmar inland over East Malling in October; a Night Heron which (though this is not mentioned) might well have been an "escape" (*antea,* vol. xlvii, pp. 352-354). A Spoonbill in May. Breeding numbers of surface-feeding ducks unusually low in many areas with few young raised owing to sea-floods early in the year. A breeding record of Tufted Ducks for 1952; several breeding pairs of Pochards. An additional Long-tailed Duck record for 1952 but none for 1953. A female Eider between 13th June and 7th July. About 800 White-fronted Geese in the early part of the year and about 100 in December; two Bean Geese in February; a Barnacle Goose in February and March. Four Bewick's Swans in March. A Kite on 27th May, apparently the first county record for this century. An interesting roost of

Hen Harriers on Walland Marsh. An unsuccessful breeding attempt by a pair of Montagu's Harriers in 1952. An Osprey in May. Few records of Hobbies and only one suggesting breeding. An unusual number of Quail records with breeding established in at least two cases. About 30 breeding pairs of Oystercatchers, a species which is increasing in the county. Breeding of a pair of Little Ringed Plovers in the interior of the county. Single Kentish Plovers in E. Kent in January, May and November and two there in September. Four Dotterels in May and two or three in August. Over 1,000 Turnstones at Shellness in August, the largest total yet recorded for the county. A Great Snipe claimed for September and another for December. Two Lesser Yellowlegs in April (see *antea,* vol. xlviii, p, 363). A Temminck's Stint in May, one in August and one claimed (without details) for the unusual date of 24th October. A Pectoral Sandpiper at Hacklinge on 6th August. Three Avocets in April and one in October. An immature Black-winged Stilt at Shellness on 15th September. Virtually no gulls or Common Terns breeding successfully in the R. S. P. B. Reserve at Dungeness, owing, it is thought, to foxes (see *antea,* pp. 193-212); a single pair of Common Terns nesting in a meadow on Walland Marsh; single Roseate Terns at Dungeness in May and June. No breeding of Short-eared Owls recorded. A Bee-eater in May (see *antea,* vol. xlvii, pp. 84-85). Wrynecks recorded in about 50 localities and at least 15 pairs known to have bred.

Two Shorelarks in December. Three Golden Orioles in May and one in July. A Jay of the nominate race killed in October. A pair of Song Thrushes and a pair of Blackbirds breeding in the mild December (cf. *antea,* vol. xlviii, pp. 120-126). One pair of Black Redstarts breeding at Margate and one at Ramsgate; 9 pairs breeding at Dover. A big drop in the Reed Warbler population in certain areas owing to the flooding. A Barred Warbler trapped at Sandwich Bay on 25th September. An unusual spring passage of Firecrests (cf. *antea,* vol. xlvii, p. 334). A Red-breasted Flycatcher at Sandwich Bay on 3rd October. Two Water Pipits in March. A Waxwing in December. An immature Woodchat Shrike trapped at Dungeness on 23rd August. A Rose-coloured Starling at Tunbridge Wells on 11th January. Crossbill immigration recorded mainly between Birchington and Dover and particularly 23rd June-10th July, with few records for the end of the year. Two Cirl Buntings in January, one in September and one in October, the only records for the past two years. Two or three Lapland Buntings for September, one for November and 7 for December. In addition, interesting details of visible migration are given for a number of species.

A Slavonian Grebe for 29th August is without a description and must therefore be considered doubtful as a Black-necked Grebe is much more likely at such an early date. Hen Harriers are mentioned as having been recorded up to 27th May and from

30th August. Such late spring and early autumn records need to be substantiated with evidence that there was no confusion with Montagu's Harriers. A Dark-breasted Barn Owl at Dungeness on 10th April is unacceptable without a description and the same applies to a Firecrest at Dover for the improbable date of 30th June. A Honey Buzzard claimed for 22nd August is described, but though some of the details given point to this species the evidence is not conclusive, e.g. it is stated that the "tail appeared blackish and thought to be long". Likewise the description of a Woodchat Shrike on 4th July "seen at 30-40 yards without field glasses", is not convincing.

No. 3 (1954).

Some 340 observers have contributed records to this number of the Report. There were eight records of Black-throated Divers but none of Great Northern Divers. A Leach's Petrel at Dungeness Lighthouse in November. Three Manx Shearwaters in September and a Balearic Shearwater seen at 30 yards range from the South Goodwin Lightship on 20th November. A Great Shearwater record for the Thames estuary for 16th August 1953. Two Cory's Shearwaters seen at 150 yards range off the Sheppey coast on 14th November are fully described and seem to have been correctly identified. Some information about the weather conditions on this remarkable occasion would have been of interest. Cormorants with the characters of the Southern race were obtained in September, November and December. Five heronries had 260 occupied nests. Three records of single Spoonbills. Recovery of N. Kent Mallard population after floods of the previous year, but breeding Shovelers still much below normal. Several summer records of Scaup. At least one pair of Tufted Ducks and nine pairs of Pochards bred. Two Long-tailed Ducks in November. A marked decrease in the number of Velvet Scoters off Dungeness in the previous three years. Eiders in all months of the year. About 400 White-fronted Geese in the county at the beginning of the year but few present at its end. Six Barnacle Geese in the first two months of the year and nine in November. Several Whooper Swans, one as late as 27th April and two immatures as early as 31st October (a description should have accompanied this last record). An adult Goshawk in September and an immature in the same area in December. Marsh Harriers in all months except February and December. Probable breeding of a pair of Montagu's Harriers. Two pairs of Quail proved to have bred and others recorded. Probably not more than 24 pairs of Oystercatchers breeding. Breeding stock of Ringed Plovers apparently declining and only about 20 pairs recorded. Single pairs of Little Ringed Plovers breeding in three localities. Kentish Plovers in March and April. Records of up to 5,000 Grey Plovers after the cold spell. A Dotterel in September and one in October. A Great Snipe is claimed for 24th April; no evidence is given (though it is stated that satisfactory details have been received), and on the information available to us the record does not inspire confidence. Spotted Redshanks in all months except February and Greenshanks in all months except February and June. Up to about 20,000 Knots in winter. Two December records of Little Stints (see *antea*, p. 169). Two Temminck's Stints in September. A Pomarine Skua on 17th October and one on 24th December. A Long-tailed Skua at Cliffe on 14th September. The breeding gulls and Common Terns at the R.S.P.B. Reserve, Dungeness, fared as badly as in the previous year. An Iceland Gull in April and one in November. Black-headed Gulls breeding in N. Kent increased to over 1,000 pairs. Kittiwakes in all months except August. A Gull-billed Tern on 9th August. A Caspian Tern in May (see *antea*, vol. xlvii, pp. 403-404). A Common/Arctic Tern in December (see *antea*, p. 75). One or two Roseate Terns between May and August. A Little Auk in January. Eleven pairs of Wrynecks were proved to have bred and about 26 more probably did so.

A Shorelark in November. A Golden Oriole was recorded in May and a 1949 record for 16th October is regarded as satisfactory by the Editor. A Hooded Crow on 28th June and two in August. First definite indication of the nesting of the Nuthatch in N. Kent in the form of an old nest. Two Ring Ouzels in early December (some evidence would not have been out of place here). A Black Wheatear in October (see *antea*, vol. xlviii, p. 132). Six to eight pairs of Whinchats bred. Eight pairs of Black Redstarts nested at Dover, but no other definite breeding records. A Bluethroat at Dungeness in August. Recovery of breeding Reed Warblers after the floods of the previous year. An Icterine Warbler trapped at Dungeness on September 2nd. Two Chiffchaffs in December. No evidence of Wood Warblers nesting. A Yellow-browed Warbler at Sandwich Bay on 10th October. A Red-breasted Flycatcher at Dungeness on 24th October. Records of a Scandinavian Rock Pipit and of a Water Pipit should have been accompanied by supporting evidence. Two Yellow Wagtails on 21st March. Waxwings in January and February and again in December. A Woodchat Shrike on 24th June and one on 26th August. Several records of Crossbills in the first half of the year including one definite breeding record. It is recorded that two Chaffinches, two Bramblings and one House Sparrow which came on board a ship in the Bay of Biscay in November stayed there "even when the Kent coast was closely passed", this being apparently considered sufficient justification for including them in the Kent Report. A pair of Cirl Buntings bred near Maidstone in 1952 and 1953. An Ortolan Bunting at Dungeness on October 3rd. Several Lapland Buntings for both ends of the year.

There is a special article on the very unusual numbers of Short-eared Owls on the N. Kent marshes. At least 50 were present towards the end of the year and about nine pairs bred. D.D.H.

THE SUSSEX BIRD REPORT, 1953 and 1954. Editors: G. des Forges and D. D. Harber. Obtainable from the former at Harefield, The Vale, Ovingdean, Brighton. 5s. each.

THE HASTINGS AND EAST SUSSEX NATURALIST (Journal of the Hastings Natural History Society). Vol. VIII. Nos. 3 and 4, April 1954 and April 1955 (for 1953 and 1954). Editor: N. F. Ticehurst, Spots House, Smallhythe, Tenterden, Kent.

WHILE the 1953 *Sussex Bird Report* still follows *The Handbook* order the 1954 one adopts the order and numbering used in the *B.O.U. Check-List*, and, in general, follows *British Birds* practice regarding English names. The more notable of the classified records in both reports are dealt with below, together with notes from the *Hastings N.H.S. Journal.*

Red-throated Divers wintered in numbers, at least 200 being seen off Newhaven on 15th February 1953, and about 300 off Pett Level, November 1954 (Hastings). There were *ca.* 300 Great Crested Grebes off this coast in November 1953, about 1,000 in January 1954 and 250 in November 1954. Five or six Red-necked Grebes were noted in the two years. A Leach's Petrel close inshore at Langney Point is stated to be the fourth Sussex September record. Two Manx Shearwaters at the same point in May 1953 make the first spring records for Sussex while a Balearic Shearwater seen there on 26th July 1953 is apparently the first July record for Britain, and is well described. A Sooty Shearwater, also described, was seen there on 30th October. This intensive watching at Langney Point, and also at Portland, is greatly assisting to build up a more satisfactory picture of Channel shearwater movements.

The 1954 Report raises the problem of subspecific identification of unusually white-headed Cormorants, and records without square brackets a Night Heron which the Editors recognize may have escaped from Edinburgh Zoo (see *antea*, vol. xlvii, p. 353). About 75 Velvet Scoters were seen off Langney Point on 30th November 1954, and about 15-20 Eiders were noted in both years. Red-breasted Merganser yielded a peak of *ca.* 130 in 1954 in Chichester Harbour, and both Goosander and Smew were also unusually numerous. The largest Brent Geese parties ranged between a dozen and fifty. A flock of 67 Grey Lag Geese was seen near Lewes in January 1953, and the largest gathering of White-fronted Geese in either year was about the same size. Buzzards nested in two areas, and Ospreys were observed on both spring and autumn migrations in both years. Four to six pairs of Peregrines bred on the cliffs; a Kite was seen at Seaford in May 1953.

Oystercatchers had little breeding success in either year, but Little Ringed Plovers, although suffering losses and disturbance, did somewhat better. Temminck's Stints, Purple Sandpipers, Grey Phalaropes and Avocets were seen in both years, about 25 Avocets being recorded flying off Hove in March 1954. A Lesser Yellowlegs was seen in September 1954 (*antea,* vol. xlviii, p. 364), a Pomarine Skua in October and an Ivory Gull in November (*antea,* vol. xlviii, pp. 546-547). Several Glaucous Gulls were present in October-December 1954, and also some Little Gulls, while in 1953 an Iceland Gull was seen in May and a Mediterranean Black-headed Gull in July. About 80-100 young Common Terns were reared both years at Rye Harbour by about double that number of pairs. Roseate Terns were seen both years and two Gull-billed Terns at Rye Harbour on 30th May 1953.

Nearly a dozen Hoopoes were observed in the two years, and in view of later events it is interesting that a Bee-eater should have been seen on 30th May 1953 passing Newhaven Harbour, only a few miles from the place where this species was to breed successfully in 1955.

Bluethroats were seen in April 1953 and in September 1954, and a Dartford Warbler, a Richard's Pipit on 18th September 1954 at the Crumbles (*antea,* vol. xlviii, p. 374), a Tawny Pipit at the same place the previous day, and Water Pipits in both years must also be noted. "Variant" Yellow Wagtails continued to be recorded. A Rose-coloured Starling was seen at Pagham on 13th May 1954 and a Serin at Langney Point on 2nd November (*antea,* p. 154). Crossbill immigration was first observed on 12th July 1953, and birds continued to be seen for several months, the last being recorded in April 1954. Lapland Buntings were seen in December 1953 and January 1954. The *Hasting Report* also gives some notes suggesting immigration of Jays in September-October 1954, and of Herring Gulls beginning to nest on roofs of buildings at St. Leonards (*cf. antea*, vol. xlviii, pp. 88-89).

Although not within our strict scope here it is impossible to refrain from drawing attention to the most interesting "Preliminary survey of the wild land mammals of the Hastings district" also contained in this number of the *Hastings and East Sussex Naturalist* (which for brevity has been referred to above as the *Hastings Report*). E.M.N.

BIRDS IN HAMPSHIRE. 1953, and BIRDS, 1954 (Hampshire). Editor: Edwin Cohen, Hazelhurst, Sway. From *Proc. Hampshire Field Club and Archaeological Society,* vol. xviii, part 3, and vol. xix, part 1, respectively.

BIRD REPORT (Isle of Wight) for 1954. Editor: J. Stafford, 24, Cypress Road, Newport, I.O.W. ROOK CENSUS (Isle of Wight), 1954, by A. J. Henty. From *Proc. Isle of Wight Natural History and Archaeological Society.*

EACH of these two issues of the Hampshire Report contains about 16½ pages of records in the order of the *B.O.U. Check-List* from about 50 observers. In that for 1954 there is also some account of the effects of the cold spell early in the year upon birds in certain localities. At the end of the 1954 report appear the *Check-List* numbers of species recorded during the year but not otherwise mentioned. The report dealing with the Isle of Wight contains 13 pages of records from about 40 observers. The *Check-List* order is followed here also and amongst the records are given the names of species which occurred during the year but about which there is nothing of interest to be said. Though there has obviously been collaboration between the editors of the two publications, it unfortunately does not appear to have been complete. A number of records in the Isle of Wight Report were apparently unknown to the Editor of the Hampshire Report. Thus the latter states that a female Hen Harrier on 13th November "is the only one reported from the Island" whereas the former gives also a record of a male on 9th November. Likewise a few records from the Isle of Wight are to be found only in the Hampshire Report. In the 1954 Hampshire Report it is stated that "it has been decided to exclude the Isle of Wight in future as they now have a report of their own and duplication of records in ours would be a waste of time". This decision cannot but be regarded as unfortunate since it means that in order to obtain a picture of bird happenings within the county two reports will have to be consulted in future.

Among the 1953 Hampshire records are the following. A Great Northern Diver in January and one in December, but no Black-throated Divers. Fulmars between April and June off the Isle of Wight. A Gadwall in November and December. Only two Scaup recorded. 90 Goldeneye in Langstone Harbour in January. Two pairs of Long-tailed Duck there as late as 5th April and two more birds at the end of the year. An Eider in December. A Goosander as late as 21st April. 600-800 White-fronted Geese in the Ringwood area in January. A maximum of about 70 Brent Geese. A female Goshawk at Fordingbridge on 8th September with no evidence of jesses (and regrettably no description). No young raised by Montagu's Harriers in any of the three areas where breeding occurred the previous year. An Osprey in June which was seen to catch a Swallow on the wing; other Ospreys recorded including one for the late date of December (see *antea*, vol. xlviii, p. 454). Quail apparently common near Damerham. A Spotted Crake in October. A pair of Little Ringed Plovers present in May in an area where breeding took place the previous year, but apparently no eggs laid; two Kentish Plovers in August. A Lesser Yellowlegs on 28th September and 2nd October (see *antea*, vol. xlviii, p. 364), the first record for the county. A Little Stint in December; an Avocet in November; a Grey Phalarope in September. An Arctic Skua in October and a Great Skua on various occasions in September. Two pairs of Great Black-backed Gulls nesting on the Needles. About 40 Lesser Black-backed Gulls between Cowes and Southampton on 22nd December. A

Glaucous Gull in October. A pair of Hoopoes breeding successfully in the north of the county. Only one (May) record of a Wryneck. Sand Martins apparently no longer breeding in the Isle of Wight. Hooded Crows in January, March and November. A Jackdaw of the Scandinavian race found shot in February. A pair of Tree-creepers building on 25th March. A Dipper in June. A Redwing of the Iceland race found dead in November. A Sedge Warbler on the very late date of 18th October. Firecrests in January, March and April, four in all (*cf. antea,* vol. xlvii, 324-325). A pair of Grey Wagtails raised three broods. The male of a breeding pair of Yellow Wagtails described as "a variant of the Sykes type", details being given. The first county breeding record of a pair of Siskins (*antea,* vol. xlvii, 209). Two pairs of Crossbills proved to breed and an apparent increase in numbers from July due no doubt to the "irruption" of that year. A Lapland Bunting in December (cf. *antea,* pp. 6-25).

The following records must be considered doubtful: two Red-necked Grebes on 20th December, the description being quite inadequate; a female Little Bittern on 9th August, from one observer without any description; two Red-breasted Flycatchers in September, no description being given although it is stated that one is available; Water Pipits in March and November without descriptions. A record of two Black Terns at Thorney Island on *14th March,* which is quoted from the *Winchester College N. H. S. Report,* is surely based upon an error in identification if it is not due to a misprint. In any case Thorney Island is in Sussex.

In 1954 Black-throated Divers (four in all) occurred in Hampshire in January, February, April and December. About 12 Great Northern Divers were recorded, one of them being found dead in the New Forest after a storm in December. Three Red-necked Grebes occurred in January and February and records are also given of up to five in Osborne Bay at both ends of the year, but we understand from the Editor that these are included in error and that an erratum will be published in the 1955 Report. A Slavonian Grebe in full summer plumage at Yarmouth from 29th to 31st July was remarkably early for southern England. A Storm Petrel was seen in November and one found dead in August. A Manx Shearwater on 1st April. Up to 13 Fulmars off the Isle of Wight between 5th April and 3rd July. A total of 114 occupied Herons' nests on the mainland plus four on the Isle of Wight. An adult male Little Bittern is stated to have been seen by three observers at Titchfield Haven on 13th and 14th June. No description is given but some confirmation is given by one being found dead on Farlington Marshes two months later. Four Spoonbills in August. Long-tailed Ducks in Langstone Harbour in January, November and December, never more than three at a time. Two Velvet Scoters. Two Eiders in January and one in December. About 250 White-fronted Geese were recorded in the Ringwood area in winter. The largest number of Brent Geese was 128 in Langstone Harbour in February; three of the Pale-breasted form were recorded. A flock of 22 Bewick's Swans in March. Buzzards were apparently spreading east as a breeding species. Details of a pair of Honey Buzzards are withheld for security reasons, but a description of the birds would have done no harm. A pair of Montagu's Harriers successfully raised two young at a second attempt. An Osprey is stated to have been seen on the early date of 6th March and two together were recorded in May and one in September. Fewer Quails recorded this year. A Spotted Crake was found dead in April and one was found alive in Portsmouth, but no date is given for this record. Spotted Redshanks in all months except June and December and Greenshanks in all months except June, November and December. A Lesser Yellowlegs in September (see *antea,* vol. xlviii, p. 364). Up to three Temminck's Stints in May. Five Ruffs in January. An Avocet shot in January, four seen in March and one in April. Two Grey Phalaropes in October. An Arctic Skua in May and an extraordinary record of a Great Skua found being tossed by cows on the Isle of Wight on 1st October; it was slightly oiled. A Mediterranean Black-headed Gull, the first for the county, on 27th April (see *antea,* vol. xlviii, p. 130).

A Black-eared Wheatear on 18th September (see *antea,* xlviii, p. 130) is the first for the county. A Firecrest in January. A pair of Pied Flycatchers feeding young in the New Forest. The variant male Yellow Wagtail recorded the previous year, or one exactly like it, returned to breed in the Farlington Marshes. A Great Grey Shrike in March.

A Goshawk on Farlington Marshes in August should have been accompanied by a description. A record of two Caspian Terns in April which is put in square brackets might very well have been omitted altogether. Two Swifts on the very early date of 5th April have apparently been accepted without description at second hand from a non-ornithologist. A Sedge Warbler on 2nd October is incorrectly said to be "quite exceptionally late". The description of an alleged Water Pipit for 24th March does not exclude a Scandinavian Rock Pipit, no mention being made of white outer tail-feathers. A record of Little Buntings is considered "provisionally acceptable" by the Editor and published in square brackets though even the number is "not stated and description still awaited". This record has since been submitted to *British Birds* and rejected.

Records of general interest in the Isle of Wight Report not contained in the Hampshire Report include a probable Lesser Kestrel in January (details were submitted to *British Birds,* but the record was not acceptable) and a party of over 20 Waxwings at the end of November. The Census of the Isle of Wight Rookeries shows that in 1932 there were 4,209 nests in 72 rookeries; in 1946, 5,244 nests in 117 rookeries; and in 1954, 4,891 nests in 144 rookeries. D.D.H.

THE BIRDS OF LEICESTERSHIRE AND RUTLAND. Report for 1953. Editors: F. A. Bak, R. A. O. Hickling and R. Eric Pochin. Obtainable from R. A. O. Hickling, 223, Swithland Lane, Rothley Plain. Price not stated.

THE BIRDS OF LEICESTERSHIRE AND RUTLAND. Report for 1954. Editor: R. A. O. Hickling. Obtainable from D. R. Coda, 44, Eastwood Road, Leicester. Price not stated.

Each of these annual Reports of the Leicestershire and Rutland Ornithological Society contains classified notes for the year. These are numbered in the order of the *B.O.U. Check-List* and all species which were recorded during the year are at least mentioned. However, these notes comprise only a relatively small part of the contents of the Reports. In that for 1953 they fill only 8 out of 44 pages and in the 1954 Report 7½ out of 25. Each contains also a map of the area, an account of the Society's activities for the year, Wildfowl Counts, a count of Great Crested Grebes, counts of winter Coot, a Ringing Report together with lists of birds ringed elsewhere and recovered in the area and lists of birds ringed in the area and subsequently recovered, and tables of the arrival and departure dates of migrants. The following are the most interesting occurrences for 1953. A Red-throated Diver in February and March and two in November. Two Red-necked Grebes early in the year. A Storm Petrel picked up exhausted in October at Loughborough. A pair of Gadwall in December. Two or three Wigeon summering on Eye Brook Reservoir. 100-150 Pintail on the same reservoir in late December. Shovelers proved to breed in two localities and present in five others during the breeding-season. A Scaup from 20th October to the end of the year and another with it on 28th December. Three pairs of Tufted Duck believed to have bred at Swithland Reservoir. A Velvet Scoter there on 5th December and a male Red-breasted Merganser at this same Reservoir on 15th February. Two White-fronted Geese at Eye Brook on 4th January. A Whooper Swan on 28th February. A Buzzard in August. A pair of Hobbies bred and raised two young in Leicestershire, this being the first breeding-record for many years. Many reports of Quail (cf. *antea*, pp. 161-166). A party of 15-20 Water Rails in December. An immature Little Ringed Plover in September. A Grey Plover on 5th April and one in the same locality on 19th and 21st May; a Turnstone on 30th August. Curlew now well established as a breeding species in W. and S.W. Leicestershire. No records of Wood Sandpipers for the first time for some years. A Spotted Redshank on 28th August; a Knot in September and two in October. A Pectoral Sandpiper at Eye Brook Reservoir on 1st August, this being the first record for the county. A Sanderling on 8th November. Two records of Glaucous Gulls (perhaps only one bird being involved), the first for the county. An adult Sabine's Gull at Leicester on

17th November, the first for the county. A Kittiwake in August. A Little Tern in August and three in September; three Sandwich Terns in May. Two Woodlarks in Bradgate Park in July. A Great Grey Shrike on 3rd April and a Woodchat Shrike on 6th June, the latter being the first record for Rutland.

Descriptions are given of rarities and these are on the whole adequate though it is rather strange that no mention is made of any white on the wing of the Sabine's Gull. We are not told how many observers contributed records but a list of the members (over 200) of the Society is given. This Report also contains an account of Starling roosts in Leicester in winter and a list of birds that have been recorded over the years within the Leicester City boundaries.

Among the records given in the 1954 Report are the following. A Red-throated Diver in September. A Bittern found in a moribund condition in February. A Spoonbill at Eye Brook Reservoir on 7th November, this being the second record for the county. Shoveler again breeding in two localities; several winter records of Scaup; two pairs of Tufted Duck breeding; Golden-eye reported on two reservoirs as late as 16th May; Red-breasted Mergansers, three in all, February, October and December. Three Pink-footed Geese on 19th November. Four Whoopers in December. Buzzards, five in all, in April, August and September; a pair of Hobbies in the area where breeding took place the previous year but no nest found. Corncrakes heard on 9th June 5th July and one seen in September. A Little Ringed Plover in August; a Turnstone in May and seven in August; a Spotted Redshank again recorded in August; a Knot in February; a Temminck's Stint on 12th September; two Sanderlings in January. Several records of Little Terns in August and September; two Sandwich Terns in August. A Ring Ouzel on 1st May. Two records of Black Redstarts (though perhaps only one bird was involved). An immature Bluethroat seen at close range in a garden at Croft on 31st August is doubtless correct, but the description here is not altogether satisfactory. A Marsh Warbler trapped in a garden in Leicester on 13th August, the first for the county. A Great Grey Shrike in January and on 15th and 18th May. An adult Rose-coloured Starling on 17th September (full details are said to have been submitted and should have been published). A Snow Bunting in January and one in December.

A list of those who have contributed records is given and contains only about 60 names, a rather small proportion of the total membership of the Society. Only eleven members are stated to be active ringers, but from 1st October 1953 to 30th December 1954 they ringed 3,849 birds of 54 species. D.D.H.

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The Society was formed in 1945 for the study and conservation of wild life in Wales.

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The activities of the Society include the co-operative study by marking (with rings, etc.) of animals, including birds and seals, and the recording of their distribution and habits in Wales. The Society's honorary wardens have taken the principal part in the protection of the Kite, supported by the Royal Society for the Protection of Birds and others.

Application to join should be made to the West Wales Field Society,
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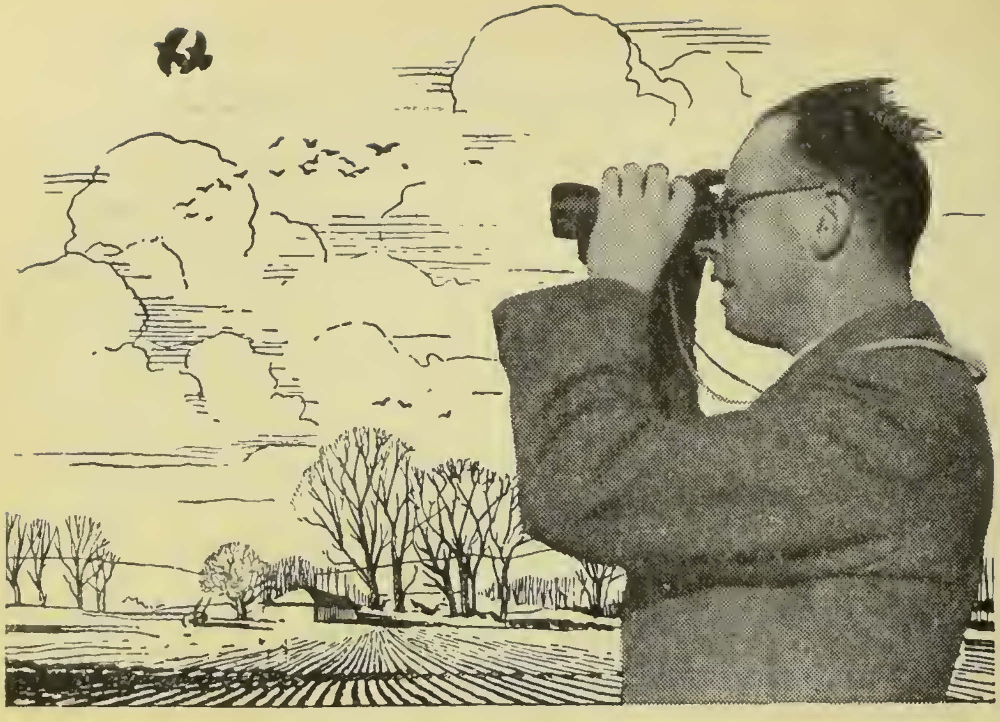

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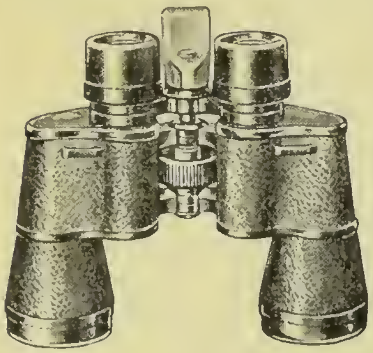

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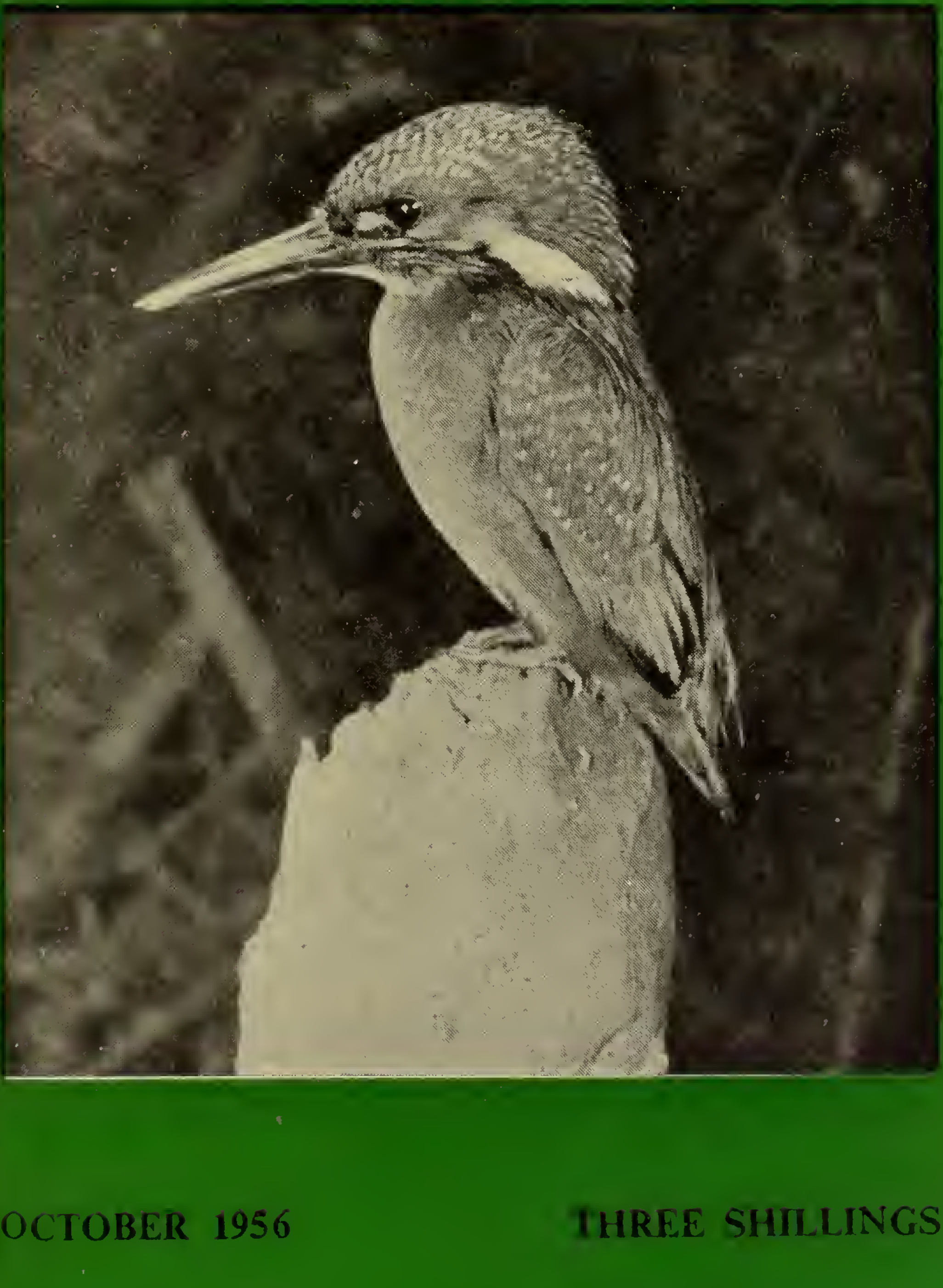

OCTOBER 1956 THREE SHILLINGS

BRITISH BIRDS

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BRITISH BIRDS

MIGRATION AT THE SMITH'S KNOLL LIGHT-VESSEL, AUTUMN 1953

By D. B. Peakall

(1) INTRODUCTION

This paper sets out the observations made from the Smith's Knoll Light-vessel (52° 43′N., 2° 18′E.) from mid-September to mid-November 1953. The vessel is 26 miles from the Norfolk coast and some 90 miles from Holland. Four observers did spells of a fortnight each:—

17th September to 1st October	H. E. Axell
1st October to 15th October	E. G. Longman
15th October to 29th October	J. H. R. Boswall
29th October to 11th November	D. B. Peakall

The expedition was organized by J. H. R. Boswall. Where field-notes are given in the systematic list of species the observers are referred to by their initials.

The main period of the autumn migration was given a far longer coverage than had been the case with any previous work carried out on light-vessels. The first studies of migration from light-vessels were carried out by Eagle-Clarke (1912) in 1903 on the Kentish Knock, where he watched from 17th September until 18th October; Owen (1953) carried out further studies from the same light-vessel from 22nd October to 5th November in 1952. A comparison with this work will be given under species headings. On the other side of the North Sea, Verwey (1922) watched from the Dutch Light-vessel "Doggersbank" from 26th August to 23rd September 1920, which is too early in the season for comparison with the present study. Mörzer Bruyns (1939) visited the "Terschellingerbank" Light-vessel from 13th to 26th October 1937. From this light-vessel, being fairly near the chain of islands off the Dutch coast, migration was observed in many directions and cannot therefore be compared with the present work. There are also some observations made from drifters in the Dogger Bank area by Murray (1927, 1930, 1931); however, although many species were identified the numbers of migrating Passerines seen were very small; for instance, no Starling* flocks larger than twenty were seen and rarely two flocks in a day even in October.

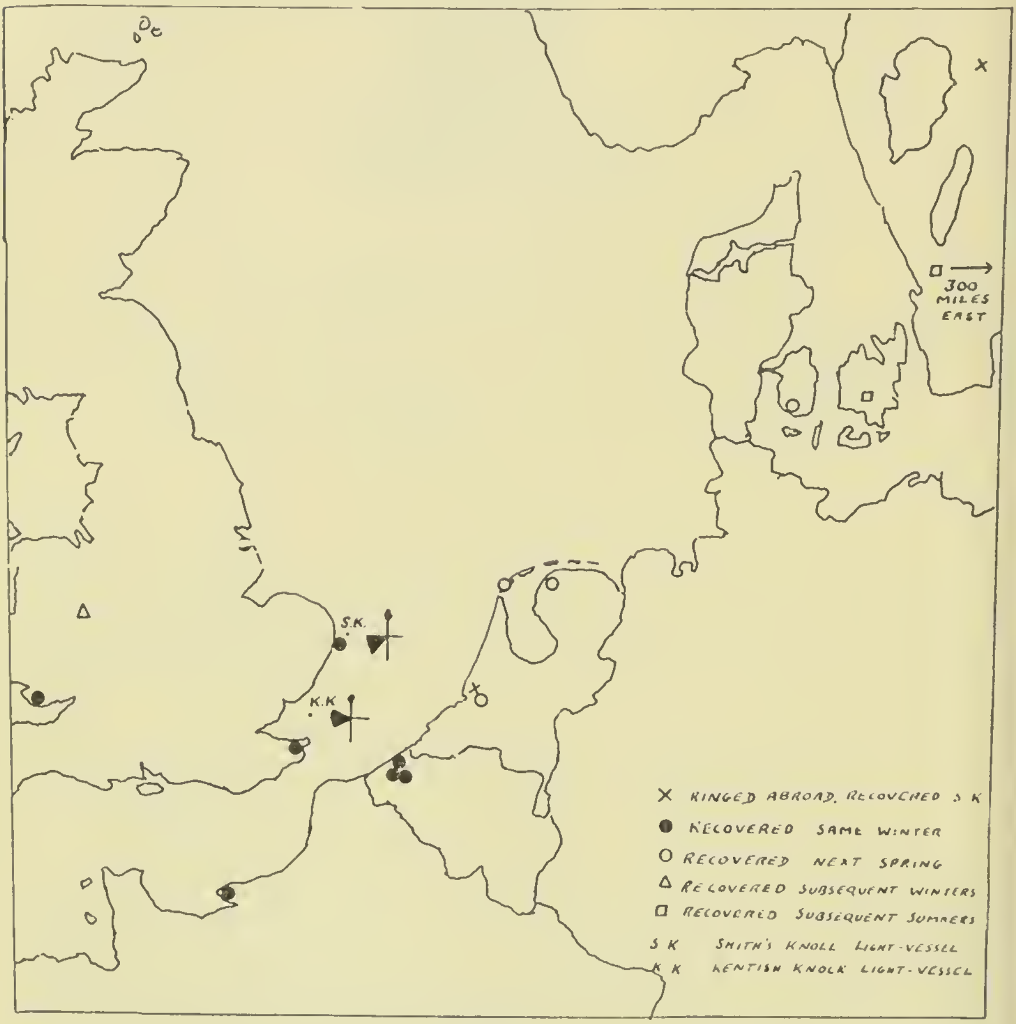
300 MILES EAST
S.K.
K.K.
× RINGED ABROAD. RECOVERED S K
● RECOVERED SAME WINTER
○ RECOVERED NEXT SPRING
△ RECOVERED SUBSEQUENT WINTERS
□ RECOVERED SUBSEQUENT SUMMERS
S K SMITH'S KNOLL LIGHT-VESSEL
K K KENTISH KNOCK LIGHT-VESSEL

FIG. 1—MAP OF THE NORTH SEA SHOWING THE POSITIONS OF THE SMITH'S KNOLL AND KENTISH KNOCK LIGHT-VESSELS

Each of the light-vessels is indicated by a four-point compass and the principal directions in which migration was recorded during the present study on Smith's Knoll and by Owen (1953) on the Kentish Knock are indicated in each case by the blacked-in portion of the compass. Also shown are the recovery positions of the 15 Starlings (*Sturnus vulgaris*) recovered out of the 700 ringed on the Smith's Knoll and the places of origin of the two foreign-ringed ones trapped there (see page 376).

During the 57 days continuous manning of the Smith's Knoll Light-vessel, 405 daylight hours were spent on watch, an average of just over seven hours per day. The number of hours of daylight varied from twelve in mid-September to eight and a half by mid-November. It is, therefore, unlikely that any major movement was missed, especially as the crew on watch would report any birds seen while the observer was below. At night the observer was called by the crew if any birds appeared at the light; a total of 105 hours were spent on deck during the hours of darkness. Most of the observations were made from the top of the wheel-house and from the boat deck, about 24 and 19 feet respectively above sea-level, but in bad weather observations were made from the wheel-house. Listening for migrants was difficult due to a small motor running continuously and was impossible when the fog-horn was going. We should like to record here our thanks to the crew for all the assistance they gave us.

---

* The scientific names of the species mentioned are given in the systematic list on pages 384-388.

The position of the Smith's Knoll can be seen from Fig. 1. It is out of sight of land and thus the direction of migration observed should be the true direction. The effect of ships appeared to be unimportant as only stragglers were seen to alter course and alight on vessels. The diurnal occurrences of the commonest migrants, together with local weather conditions are given in Table I. The period prior to 6th October is not detailed as very little diurnal migration was observed before this date.

TABLE I—DIURNAL MIGRANTS OBSERVED AT THE SMITH'S KNOLL IN 1953

Date	Wind direction and force	General weather conditions	No. of migrants		
			Starling	Chaffinch	Rook
17.ix-5.x			3	0	0
6.x	NW 4	Fine at first, cloudy later	4	0	0
7.x	N to NNE 5-4	Overcast	88	2	0
8.x	N 4-3	Overcast	29	5	0
9.x	WSW 2	Fine	0	2	0
10.x	WSW 2	Fine	0	180	26
11.x	SE 2-3	Fine	3	250	0
12.x	S 2-3	Fine	16	172	38
13.x	ESE 2	Cloudy, rain later	505	36	216
14-x	NE to NNE 4-6	Cloudy	0	0	0
15.x	NNE 6-5	Squally	0	0	0
16.x	NW 3-2	Cloudy, becoming fine	0	4	0
17.x	NW 2-1	Cloudy	280	30	6
18.x	N 3-4	Cloudy, clearing later	1050*	0	0
19.x	NNE 4-3	Cloudy, clearing later	122	3	2
20.x	NNE 2	Mainly fine	0	0	0
21.x	NNW 2	Cloudy, clearing later	0	0	0
22.x	NNE 2	Cloudy	783	8	3
23.x	S 2	Overcast	0	4	70
24.x	SW 2-5	Fine	0	0	92
25.x	S 4	Fine	241	0	346
26.x	SW 2-5	Mainly fine	792	116	42
27.x	S 6-7	Squally	875	0	30
28.x	SW 3	Mainly fine	178	1	0
29.x	E 1	Fine	50	1	0
30.x	SW 4-5	Cloudy	756	0	0
31.x	SW 4-3	Mainly fine	0	0	43
1.xi	S 6-7	Squally	0	0	0
2.xi	SW6-7	Squally at times	0	0	0
3.xi	W 3	Mainly cloudy	148	0	23
4.xi	S 5-6	Squally	131	11	0
5.xi	WSW 2	Cloudy	412	0	0
6.xi	NW 4-5	Cloudy	51	0	1
7.xi	SW 6-7	Cloudy	0	0	0
8.xi	W 4-3	Cloudy	0	0	16
9.xi	W 3	Cloudy	0	0	0
10.xi	W 4	Fine	1	0	8
11.xi	WSW 5-6	Fine, cloudy later	0	0	0
			6518	825	962

* All arrived during the night and departed after dawn.

(2) MOVEMENTS OF STARLINGS

As has been found by other observers—Owen, Lack (1954)—the Starling is the most common migrant observed and it is therefore possible in this case to make a more detailed analysis of the factors influencing migration than for the other species. It does not seem possible to correlate the local weather conditions with numbers of migrants observed. There are several blank periods (see Table I) and while two of these, 14th-16th October and 31st October-2nd November occured at times of gales, considerable movement was observed on the 26th and 27th October, under equally bad conditions; and Starlings were seen on only one day of the calm period 20th-24th October. It is, of course, expected that the local weather conditions would be relatively unimportant and that the conditions prevailing at the point of departure are more important. Migration in relation to general weather conditions and the East Coast observatories is considered in section (8).

The direction in which Starlings were seen moving on "good" days are given in Table II. The wind direction and strength (Beaufort scale) are given under the date.

It will be seen that the commonest direction is S.W. and that 80% passed between S.S.W. and W. The direction of migrating Starlings is therefore noticeably more southerly than was observed by Owen on the Kentish Knock Light-vessel, where two-thirds of the birds flew west and most of the remainder W.N.W. or N.W. These directions in relation to the North Sea can be seen in Fig. 1.

Owen examined the effect of wind on direction of migration on a day when the wind varied considerably and found that there was some relation, but concluded that, generally, wind direction had little effect. On what evidence the latter statement is based he does not say, for the wind was mainly westerly throughout his period of stay and therefore a wide range of reading was not possible. We had no such conditions of variable wind on one day, but an examination of Table II, where the force and direction of the wind are given immediately under the date, enables the effect of wind direction to be evaluated. It is not proposed to attempt any detailed calculations, but it may be mentioned that the speed of a Starling is about 30 m.p.h.; about equivalent to a force 5-6 wind. The effect of a strong southerly wind would be to set the direction more to the west. This is clearly shown over the period 26th-30th October, when the wind backed south and increased in strength, the direction tended distinctly westerly. There are insufficient data to indicate whether or not overcast conditions have an effect.

Owen found that with a wind force of 5 or more, the flocks of Starlings tended to be smaller, suggesting that the wind broke up the flocks. The average flock size is given at the foot of Table II; there appears to be no correlation in the case of our data.

Of the 700 Starlings ringed, 15 have so far been recovered and in addition two foreign-ringed Starlings were trapped. These are plotted in Fig. 1. From the foreign-ringed birds and the recoveries in the breeding-season it will be seen that the main area from which

TABLE II—DIRECTION OF STARLINGS (*Sturnus vulgaris*) AT THE SMITH'S KNOLL ON "GOOD" DAYS IN AUTUMN 1953

	13 Oct. ESE.2	17 Oct. NW.2-1	18 Oct. N.3-4	22 Oct. NNE.2	25 Oct. S.4	26 Oct. SW.2-5	27 Oct. S.6-7	30 Oct. SW.4-5	5 Nov. WSW.2	Total (all days)	% of flocks† (1)	(2)
E	—	—	—	—	—	—	—	—	—	2/1	0.6	0.0
ESE	30/1*	—	400/1	—	—	—	—	—	—	432/3	1.7	0.0
SE	30/1	—	—	9/1	—	—	—	—	—	69/3	1.7	0.0
SSE	—	—	—	172/11	—	—	—	—	—	172/11	6.2	0.0
S	75/1	—	—	—	—	20/2	—	20/3	3/1	120/9	5·1	0.0
SSW	243/17	—	—	559/10	—	10/1	—	—	—	992/30	16.9	0.0
SW	90/2	171/4	400/1	11/1	75/3	721/20	—	396/9	—	1772/45	25·5	5·8
WSW	—	109/7	50/1	31/3	77/3	21/3	—	233/3	70/1	880/30	16.9	4·3
W	1/1	—	200/1	1/1	29/4	20/1	525/5	101/2	286/6	1427/33	18.6	69.6
WNW	—	—	—	—	—	—	300/1	—	25/1	421/9	5·1	12.1
NW	—	—	—	—	—	60/1	—	—	28/1	90/3	1.7	7·7
NNW	—	—	—	—	—	—	—	—	—	—	0.0	0.5
Av. flock size	18	25	262	28	18	30	138	44	41	36		

*In this and the following tables the first figure is the number of birds and the second the number of flocks.
†In the percentage columns the first figures refer to this work and the second are calculated from Table II of Owen's (1953) paper.

the Starlings have come is the north-west coast of Europe, though one was recovered two summers later in Russia (Baltic provinces). The most interesting recoveries are those from Flanders, where three birds were recovered during October and November, one in fact only three days after it had been ringed. South-eastwards departure was noted by observers during the autumn watch in 1952 (Lack, 1954) who concluded that in view of the negligible number of British Starlings which have been recovered abroad that this must be a through passage, presumably of Scandinavian birds. It is very probable that our ringed birds which were recovered in Flanders were taking part in this movement, although it is possible that the birds leaving the light-vessel at dawn or when the sky cleared, reorientated themselves incorrectly and returned to the Continent. It should be mentioned that about 10% of all Starling flocks we observed were flying in directions between east and south south east during the day (see Table II).

(3) MOVEMENTS OF CHAFFINCHES

Although, apart from the Starling, the Chaffinch was one of the most numerous migrants, there are insufficient data to make a detailed analysis of the variation of day-to-day directions. A summary of the directions observed is given in Table III.

TABLE III—DIRECTION OF CHAFFINCH (*Fringilla coelebs*) MIGRATION AT THE SMITH'S KNOLL IN 1953

Direction	No. (bird/flocks)	% (of birds)	Direction	No. (bird/flocks)	% (of birds)
NNE	1/1*	0.1	WSW	603/36	63.6
ESE	1/1	0.1	W	96/9	10.1
SSE	20/1	2.1	WNW	22/3	2.3
SSW	3/1	0.3	NW	10/1	1.0
SW	191/12	20.1	NNW	2/1	0.2

* See footnote to Table II.

The days on which the largest numbers occurred can be obtained from Table I. The probability that much Chaffinch migration occurs at a considerable height—Lack (1954), Van Dobben (1953)—was supported by the appearance of single birds on board when little migration was visible and by the rather high number of calls heard when birds could not be seen. Both these factors were more noticeable for the Chaffinch than for other species. Three males killed at the light were examined by Dr. J. M. Harrison and were found to be of the Central European form (*F. c. hortensis*). Bramblings occurred during much of the period, the first being seen on 6th October. The number of Bramblings seen during daytime was low, only 21 individuals being noted compared with nearly a thousand Chaffinches, but the nocturnal figures show a different picture; 270 Chaffinches to 120 Bramblings. The numbers are, however, too small for it to be said whether they are significant. The main noctural movements of Bramblings were on the nights of 12th/13th and 13th/14th October which coincide with the appearance of large numbers of Bramblings on the Norfolk, Suffolk and Essex coasts.

(4) MOVEMENTS OF ROOKS

As with the Chaffinch the direction of movements of Rooks has not been tabulated for individual days, but the total directions are summarized in Table IV.

TABLE IV—DIRECTION OF ROOK (*Corvus frugilegus*) MIGRATION AT THE SMITH'S KNOLL IN 1953

Direction	No. (bird/flocks)	% (of birds)	Direction	No. (bird/flocks)	% (of birds)
E	1/1*	0.1	WSW	187/20	20.4
S	5/1	0.5	W	315/27	34·5
SSW	217/7	23·7	WNW	52/2	5·7
SW	92/17	10.0	NW	47/3	5·1

* See footnote to Table II.

Rooks were observed to fly higher than most of the migrants, often 200 feet above sea-level, usually in loose flocks. The only nocturnal records are:—2 on 10th/11th October, 3 on 12th/13th October and 2 on 17th/18th October.

(5) MOVEMENTS OF SKYLARKS

The numbers of Skylarks observed were smaller than expected; there were only two days on which considerable movement was observed, 22nd and 26th October, when 99 birds in 19 flocks and 84 birds in 11 flocks were recorded respectively. The directions are summarised below in Table V.

TABLE V—DIRECTION OF SKYLARK (*Alauda arvensis*) MIGRATION AT THE SMITH'S KNOLL IN 1953

Direction	No. (bird/flocks)	% (of birds)	Direction	No. (bird/flocks)	% (of birds)
WNW	6/1*	2.7	SW	124/17	56.7
W	7/4	3.2	SSW	43/8	19.6
WSW	36/11	16.4	S	3/3	1.4

* See footnote to Table II.

It was more numerous as a nocturnal migrant, the main movements being on 27th/28th September, 13th/14th October and 17th/18th October; on all these occasions about 200 Skylarks were present.

(6) MOVEMENTS OF LAPWINGS

The Lapwing occurred both as a nocturnal and diurnal migrant. The directions of migration observed are given in Table VI.

TABLE VI—DIRECTION OF LAPWING (*Vanellus vanellus*) MIGRATION AT THE SMITH'S KNOLL IN 1953

Direction	25 Sept.	28 Sept.	7 Oct.	12 Oct.	17 Oct.	27 Oct.	Total (all days)
S	—	—	—	—	—	—	1/1
SW	24/1*	—	7/1	—	30/1	—	62/4
WSW	—	49/3	—	—	—	—	49/3
W	—	21/2	—	30/1	100/1	50/1	201/5
N	—	1/1	—	—	—	—	1/1

* See footnote to Table II.

The nocturnal records are:— several heard on 27th/28th September, heard from 23.15 hours to 03.00 hours on 17th/18th October and two seen on 27th/28th October.

The average height of the flocks was about 100 feet above sea-level, the extremes being 20 feet and 300 feet. Evidence has been put forward by Lack (1954) for Lapwings flying very high over the sea. They have been recorded at considerable heights on several occasions by Mitchell (1955), although he concludes that generally there is very little flying above 500 feet. However, if the Lapwing is largely a nocturnal migrant (Snow, 1953) then the amount of diurnal migration we observed might be expected to be a considerable part of the whole.

(7) NOCTURNAL MIGRATION

The extent of nocturnal migration is, of course, very difficult to assess, since it becomes noticeable only on nights when birds are attracted to the light. The latter is 40 feet above sea-level, gives a white triple flash every 20 seconds. It can be seen 14 miles away in clear weather. We found, as was already well known, that birds were attracted to the light only when the sky was wholly overcast or in thick mist and especially so under conditions of high relative humidity when the beams appeared particularly bright. We observed more non-Passerines at the light than did Eagle-Clarke, who saw only two in a month on the Kentish Knock, or Owen who mentions only a Short-eared Owl and a Water Rail. We recorded ten species of non-Passerines at the light, details of which can be found below and in the systematic list. We did not do much listening for calls on clear nights since, as an almost continuous watch was kept in the daytime, we had to restrict our night watching to the more favourable nights.

On nights on which birds are attracted to the light, it is very difficult to assess, except relatively to other nights, the importance of the movements involved. For, although the birds are more readily identified and counted, nothing is known about the distance from which migrants are attracted or what percentage of the migrants that pass into that area are attracted to the light.

The extent to which nocturnal migration takes place, even when little diurnal movement occurs, is well shown by the occurrence of many species on the night of 27th/28th September, the only night of late September on which conditions were favourable for attraction of migrants to the light, viz. 8/8 cloud; rain; wind W.S.W., force 4. The birds observed on that night were 200-300 Skylarks, 50 Starlings, 20 Song Thrushes together with smaller numbers of Blackbirds, Wheatears, Pied Flycatchers and a Ring Ouzel. Many non-Passerines were seen or heard, Storm Petrel, Water Rail, Lapwings, Grey Plover, Snipe, Curlew, Dunlins and terns.

Other nights on which large movements were noted were as follows.

13/14th October:— Wind E.S.E., force 2, 8/8 cloud. 200 Skylarks, 100 Redwings, 100 Bramblings, 20 Song Thrushes, a few Blackbirds, two Leach's Petrels, a Fieldfare, a Water Rail and a Tawny Owl.

17th/18th October:— Wind N.N.E., force 4, 8/8 cloud, rain. 1,500 Starlings, 200 Skylarks and 150 Chaffinches were the main species, also Rooks, Bramblings, Redwing, Blackbird and a Storm Petrel.

18th/19th October:— Wind N.N.E., force 4, 8/8 cloud, rain. 600 Starlings.

21st/22nd October:— Wind E.S.E., force 2, 8/8 cloud. 500 Starlings.

22nd/23rd October:— Wind E.S.E., force 2, 8/8 cloud, rain. 400 Starlings, 20 Chaffinches, 20 Skylarks, 10 Meadow Pipits, Lapwings, a Brambling and a Leach's Petrel.

27th/28th October:— Wind S.S.W., force 2, 8/8 cloud, rain. 3,000 Starlings, the only other species being a Lapwing and a Leach's Petrel.

6th/7th November:— Wind S.W., force 5, 8/8 cloud, rain. 300 Starlings and 10 Snow Buntings.

No nocturnal migration was noted on 15th/16th October or 31st October/1st November, despite 8/8 cloud and rain.

(8) DISCUSSION

It is generally considered that the largest departures of Passerines migrating diurnally occur from the Continent at dawn —Van Dobben, Lack (1954). Our observations on the time of migration are summarized in Table VII. The direction and force of wind which would be expected to modify the time taken from the Continent is given immediately under the date.

The Smith's Knoll is about 110 miles from the Dutch coast, taking E.N.E. as the average direction, and thus the peak would be expected to occur at 3-4 hours after dawn. It will be seen at once that the Starling, for which by far the largest amount of data is available, fits very well into this theory. The numbers seen after midday were exceptionally small, and on only one day (13th October) was migration observed throughout the day. The Chaffinch and Rook also show a peak at 3-4 hours after dawn, although there was considerable movement in the afternoon. The information on the Skylark is rather thin, but the largest movements were within the period 3-4 hours after dawn. The Lapwing, the only non-Passerine species for which we have much data, shows no peak at this time, indeed, little migration was noted early in the day.

The direction of migration is given under the individual species, but a brief comparison with the directions observed in the watch organized by Lack (1954) in the autumn of 1952 is now made. These observations were made further south than ours and the directions observed were, in general, rather to the north of west, whereas we found that nearly all migration occurred between S.W. and W. These directions are best considered in relation to the geography of the North Sea (see Fig. 1). Tracing the directions it appears that the migrations observed came from Holland and arrived in Norfolk. The recoveries of Starlings in the breeding-season in Holland and Denmark support this conclusion.

The pattern of migration at the East Coast bird observatories in 1953 in relation to the meterological conditions has been reviewed by Cornwallis (1954) and further information has been

TABLE VII—TIME OF MIGRATION AT THE SMITH'S KNOLL IN AUTUMN 1953

Time after dawn (hours)	Starlings							Rooks		Chaffinches	Skylarks	Lapwings
	13th Oct.	17th Oct.	26th Oct.	27th Oct.	30th Oct.	5th Nov.	Total (all days)	25th Oct.	Total (all days)	Total (all days)	Total (all days)	Total (all days)
0- 1	—	—	—	—	3/1*	—	48/3	—	—	6/4	1/1	1/1
1- 2	—	60/1	—	450/3	3/2	—	618/9	131/6	161/7	1/1	6/2	—
2- 3	—	73/3	—	375/3	385/8	291/6	1141/21	24/2	86/5	72/5	25/7	—
3- 4	1/1	137/6	371/11	50/1	126/4	96/3	1112/37	54/5	305/20	151/10	57/14	101/2
4- 5	120/7	12/1	337/8	—	236/6	25/1	1046/26	54/8	104/15	139/17	—	50/1
5- 6	109/5	—	—	—	3/2	—	130/9	32/3	62/8	74/10	9/3	1/1
6- 7	69/6	—	—	—	—	—	131/9	17/4	53/12	58/4	27/4	81/4
7- 8	65/5	—	60/4	—	—	—	137/10	—	18/4	105/6	1/1	22/1
8- 9	115/5	—	15/1	—	—	—	130/6	34/3	104/4	54/5	—	26/1
9-10	1/1	—	—	—	—	—	1/1	—	—	3/3	—	7/1
10-11	—	—	—	—	—	—	—	—	—	—	—	24/1

*See footnote to Table II. Departures of birds which had roosted on the light-vessel and departed after dawn are omitted, although these birds are included in the direction of migration tables where this is known. Due to full details not always being recorded in the log the total of birds recorded above does not always correspond to the number in Table I.

obtained from local reports. Cornwallis found that the second half of September saw a prolonged Continental drift; on the lower East Coast there was an influx of Pied Flycatchers, Whinchats (*S. rubetra*) and Redstarts on 16th/18th September; Redstarts, Wheatears, the first thrushes and a small movement of Goldcrests occurred later in the month. During this period very little migration was observed at the Smith's Knoll, but it must be remembered that all the above species are primarily nocturnal migrants. On the only night of this period when conditions were favourable for the attraction of birds to the light (27th/28th September) many of the above mentioned species were present (see previous section). The few diurnal migrants seen included Redstarts on five days and Song Thrushes on four.

During the first week of October an anticyclone was almost stationary over the British Isles and little Continental drift occurred; this correlates with the almost complete absence of migrants observed at the Smith's Knoll. Cornwallis records that the first major immigration of winter visitors occurred during 6th/9th October and on the 8th Skylarks, Lapwings and Starlings were flying in from the east for most of the day at Cley, Norfolk. The only migration observed on the light-vessel at that time was a fairly small movement of Starlings, a party of Skylarks and a report by the crew of seven Lapwings. After this period Cornwallis does not give much detail and comparison has been made with local reports: this is more difficult as regular watching is not often carried out. The two most regularly watched areas appear to be Cley, Norfolk, and Lowestoft, Suffolk. Comparison is generally easier with the rarer species than with very common ones. However, large numbers of Starlings were observed at Lowestoft and Benacre in Suffolk and at Bradwell in Essex on 18th-19th October, which agrees with the largest movement recorded by us. The large number of Bramblings observed on the Norfolk, Suffolk and Essex coasts from 13th to 16th October agrees with the occurrence of considerable numbers at the light on the nights of 12th/13th and 13th/14th October. The occurrence of Mealy Redpolls (*C. f. flammea*) on 19th October, when redpolls were also recorded from the Haisborough and Corton Light-vessels, agrees with the occurrence of this subspecies at Lowestoft in Suffolk on the 20th and at Cley, Hunstanton and Scolt Head (all Norfolk) on the 21st.

It will be seen that in general the migration observed at the Smith's Knoll can be correlated with that on the east coast. However, a wider light-vessel coverage and more quantitative studies on the mainland are needed to obtain detailed information.

The possibility of birds resting on the water during migration has been mentioned briefly by Murton (1955) who, from the South Goodwin Light-vessel, noted Starlings and a Skylark resting on the water. Our only observations concern Redwings and a Song Thrush, but in all cases it seemed almost certain that the birds perished. It seems unlikely that resting on the water would be of any importance in migration. For unless Passerines were exhausted they would not be likely to take to the water. Much Passerine migration was seen to take place very close to the waves and some occurrences of birds successfully flying up from the surface may well be after accidentally touching the water, as Murton suggests. In transatlantic migration the idea of resting on the water is not in agreement with the theory that such migration occurs with a strong down-wind; under these conditions the sea would be expected to be too rough for a small Passerine to survive.

(9) RINGING

In all 1,072 birds of 24 species were ringed. Details are given in the following table.

TABLE VIII—NUMBERS OF BIRDS RINGED AT THE SMITH'S KNOLL IN 1953

Leach's Petrel	9	Robin	1
Storm Petrel	8	Reed Warbler	1
Kestrel	1	Blackcap	1
Water Rail	1	Goldcrest	1
Moorhen	1	Pied Flycatcher	3
Skylark	121	Meadow Pipit	18
Rook	2	Starling	700
Fieldfare	1	Greenfinch	1
Song Thrush	1	Mealy Redpoll	2
Redwing	27	Chaffinch	141
Blackbird	4	Brambling	23
Redstart	3	Snow Bunting	1

The majority of these birds were caught with small hand nets at night as they fluttered against the lantern glass. Others were picked up as they roosted on the deck and rails. By day a few birds were caught with angler-type landing nets, sometimes with bread-bait. Ringing at lighthouse lanterns has been carried out for many years, but lightship work had not previously been attempted; it obviously has great possibilities.

The only recoveries, apart from Starlings which are plotted on Fig. 1 and have already been discussed, are a Brambling which was found dead on a drifter off Ushant on 23rd October 1953, two days after it had been ringed—it joined the ship in the North Sea—and a Kestrel which was recovered at St. Vaast en Cambresis (Nord) France (52° 12′N., 3° 25′E.) on 13th October 1953, 16 days after ringing—Thomson and Spencer (1954).

(10) SYSTEMATIC LIST

A detailed summary of the observations made for each species is given in the following list: the records should be read in conjunction with Table I and Sections (2) to (7) where observations of species recorded often enough for detailed analysis are given.

LEACH'S PETREL (*Oceanodroma leucorrhoa*).—Nine were recorded (all ringed) during the period 3rd-28th October. All occurrences at night.

STORM PETREL (*Hydrobates pelagicus*).—Twenty occurrences throughout the period of observation, mainly seen at the light at night. The largest number was six on the night of 3rd/4th October.

MANX SHEARWATER (*Procellaria puffinus*).—One on 16th September, and five, possibly six, on 31st October.

SOOTY SHEARWATER (*Procellaria grisea*).—One, 31st October. Appearance completely black except for a not very conspicuous pale line on the underwing. Appeared larger and heavier than Manx Shearwater which was also seen that day. Passed within 150 yards of the ship (D.B.P.).

FULMAR (*Fulmarus glacialis*).—Two seen on 8th October form the only record for the Smith's Knoll, but one was also seen at the Cross Sands Light-vessel on 15th October.

GANNET (*Sula bassana*).—Present in the area throughout the period of observation, numbers increasing during September and October, reaching a maximum by the end of October, when 20-30 birds were seen in a day, then decreasing during November. The proportion of immatures decreased from about 50% in September to 10% in November. Generally no distinct movement was seen, but there was a distinct southerly movement involving *ca.* 50 birds on 25th/26th October.

MALLARD (*Anas platyrhynchos*).—One seen by the crew at the light on the night of 12th/13th October.

WIGEON (*Anas penelope*).—Party of 25 seen flying high on 27th October ; a flock probably of this species seen on the previous day.

COMMON SCOTER (*Melanitta nigra*).—Seen on ten occasions, totalling 110 birds, throughout the period ; no definite movement was observed.

GEESE (*Anser* spp.).—Ten grey geese on 6th November.

SPARROWHAWK (*Accipiter nisus*).—One on 10th October ; two on 17th October ; and one on 18th October.

KESTREL (*Falco tinnunculus*).—One on 27th/28th September and one on 3rd/4th October.

WATER RAIL (*Rallus aquaticus*).—At least three at the light on 27th/28th September ; one was killed at the light on 12/13th October.

MOORHEN (*Gallinula chloropus*).—A young bird on board on 29th September ; it was caught and ringed.

LAPWING (*Vanellus vanellus*).—See Section (6).

GREY PLOVER (*Charadrius squatarola*).—One heard on the night of 27th/28th September.

TURNSTONE (*Arenaria interpres*).—One seen at the light, 19th/20th September.

SNIPE (*Capella gallinago*).—One seen at the light, 27th/28th September.

CURLEW (*Numenius arquata*).—40, probably of this species, flying S.W. on 27th September ; heard during the night of 27th/28th September. 40 seen flying S.W. on 22nd October and 5 flying W. on 3rd November.

DUNLIN (*Calidris alpina*).—One seen on 22nd October ; a flock of 100 on 3rd November was probably of this species.

ARCTIC SKUA (*Stercorarius parasiticus*).—An immature, probably of this species, 4th November and a dark phase adult on 10th November.

GREAT SKUA (*Stercorarius skua*).—Recorded on eighteen occasions throughout the period. As this species was not noted by Eagle-Clarke and only once by Owen on the Kentish Knock, this frequent occurrence at the Smith's Knoll may be due to the presence of large numbers of gulls dependent on the drifters.

GREAT BLACK-BACKED GULL (*Larus marinus*).—Recorded in small numbers from the beginning of the period of observation until 21st October, when numbers increased sharply: *ca.* 50 were seen on the 22nd and *ca.* 250 by the 24th. On 25th and 26th October there was a large south-westerly movement, involving at least 400 on the 25th and 300 on the 26th—it was "quite different from the random direction of previous days" (J.H.R.B.). After this *ca.* 200 were usually seen following drifters, and the largest flock was *ca.* 400 on the 8th November.

LESSER BLACK-BACKED GULL (*Larus fuscus*).—Present in fair numbers (20-50) in mid-September, increasing to *ca.* 100 by the end of the month. 50-100 were recorded daily during the first half of October with a maximum of 250 on the 11th. Numbers decreased sharply in mid-October and afterwards no more than three adults were seen on any one day. Juveniles seen may have been referable to this or the next species.

HERRING GULL (*Larus argentatus*).—Not recorded until 27th September, then only a few occurrences (daily maximum three) until 10th October, when ten were seen. There was a total of 50 on the 11th and 100 on 12th October; afterwards variable numbers, maximum ten, recorded on most days. More numerous (20+) in November.

COMMON GULL (*Larus canus*).—Only recorded twice before 24th October. Small southerly movement 24th-26th October involving, in all, 50 birds; afterwards a few noted until the end of the period.

LITTLE GULL (*Larus minutus*).—One adult and one immature on 28th October (J.H.R.B.). One adult and two immatures on 30th October and one immature on 2nd November (D.B.P.).

BLACK-HEADED GULL (*Larus ridibundus*).—Reported on thirty days throughout the period, normally less than ten occurrences per day. No distinct movement, although direction of flight usually S.W. to S. This species was observed far more frequently by us from the Smith's Knoll than by Owen at the Kentish Knock, although both are about the same distance from land. A party of twelve was seen several times flying round the light on the night of 5th/6th October. This was the only record of gulls at the light.

KITTIWAKE (*Rissa tridactyla*).—Only once recorded in September, thereafter noted on 28 days; *ca.* 40 on 22nd October was the maximum, although in general the numbers were highest in November when *ca.* 20 were recorded daily.

COMMON/ARCTIC TERNS (*Sterna hirundo* and *macrura*).—One or two birds recorded on several occasions in September, and on the 28th a total of 21 in two parties was seen. Single birds were noted three times in October, the last being on the 24th.

RAZORBILL (*Alca torda*).—The only record is of 12 seen S.E. of Yarmouth from the relief vessel on 15th October.

GUILLEMOT (*Uria aalge*).—Recorded on 37 days throughout the period, usually less than 6 a day; however, 15 were seen on 6th October, 33 on the 7th and 18 on the 8th. There appeared to be no particular direction.

TAWNY OWL (*Strix aluco*).—One seen on the night of 13th/14th October; one was also caught aboard the Cross Sand Light-vessel on the same night and described by W. R. Wright to J.H.R.B.

SHORT-EARED OWL (*Asio flammeus*).—One appeared at the light at 22.30 hours on 18th October and remained until 08.45 hours the next morning . An owl, probably of this species, was recorded at the Cross Sands Light-vessel on 11th/12th October.

WOODLARK (*Lullula arborea*).—One, 23rd October. The cleaner appearance, its shorter tail and unfamiliar note were immediately noted; it allowed approach to within six feet, when the eye-stripe and the more contrasted plumage could be clearly observed; legs appeared short (J.H.R.B.).

SKYLARK (*Alauda arvensis*).—See Section (5).

SWALLOW (*Hirundo rustica*).—One was seen from the relief vessel on 17th September, and one closely circled the Smith's Knoll several times on 26th September.

HOODED CROW (*Corvus cornix*).—Single birds on 22nd and 25th October.

ROOK (*Corvus frugilegus*).—See Section (4).

JACKDAW (*Corvus monedula*).—Recorded, usually with Rooks, on five days between 10th and 27th October.

WREN (*Troglodytes troglodytes*).—One on board for several hours on 19th October.

FIELDFARE (*Turdus pilaris*).—First occurrence, 13th/14th October. One or two recorded on four days, all during daylight.

SONG THRUSH (*Turdus philomelos*).—Only a few recorded. Seen during the day on 7 occasions, totalling 9 birds, and 20 were recorded at the light on 27th/28th September and 13th/14th October.

REDWING (*Turdus musicus*).—By far the commonest thrush. Two were seen on the night of 27th/28th September, then no records until *ca.* 100 were present on 13th/14th October. A few were noted in the next few days during the daytime, then 11 were recorded on 19th October and 53 on the 20th.

RING OUZEL (*Turdus torquatus*).—An adult male at the light on the night of 27th/28th September.

BLACKBIRD (*Turdus merula*).—Only a few records: 11 birds on 3 nights and 7 recorded on 4 days.

WHEATEAR (*Oenanthe oenanthe*).—2 or 3 on 27th/28th September and one on 3rd/4th October.

REDSTART (*Phoenicurus phoenicurus*).—Occurred in small numbers, as both diurnal and nocturnal migrant, during September. Largest numbers were 10 during 23rd September and 10 on the night of 27th/28th September. Also recorded on three dates in October, the last being the 13th/14th.

ROBIN (*Erithacus rubecula*).—Four recorded on 19th October and single birds on the 20th and the 22nd. This species was not noted at the light on any occasion.

REED WARBLER (*Acrocephalus scirpaceus*).—An account of the occurrence of a single bird on 4th November, the latest recorded for the British Isles, has already been published—Peakall (1954).

SEDGE WARBLER (*Acrocephalus schoenobaenus*).—One came on board and died in September ; it was shown by the master, J. W R. Reeve, to H.E.A.

BLACKCAP (*Sylvia atricapilla*).—A female was seen on the night of 19th/20th September and a male was caught during the afternoon of 28th September.

BARRED WARBLER (*Sylvia nisoria*).—One was caught at 00.40 hours on 4th October. It had uniform bluish-grey upper-parts, and under-parts uniform off-white ; no eye-stripe ; bill slender, metallic grey in colour ; legs also metallic grey, but with a tinge of flesh colour in the tarsus ; iris brown. Measurements: total length 165mm. ; wing 85mm ; tarsus 26mm. Identification checked by examination of skins at British Museum (Natural History) (E.G.L.).

WHITETHROAT (*Sylvia communis*).—Three recorded on 24th September.

CHIFFCHAFF (*Phylloscopus collybita*).—One on 23rd September and another on 19th October were both well seen but not caught.

GOLDCREST (*Regulus regulus*).—Single birds on 12th, 15th and 18th October. Four seen at the light on 19th/20th October when the species was also recorded from the Haisborough, Corton and Cross Sands Light-vessels. Three recorded on 22nd October. One killed at the light on 19th/20th October was, in the opinion of Dr. J. M. Harrison, of the Continental race, *R. r. regulus.*

PIED FLYCATCHER (*Muscicapa hypoleuca*).—At least three on 19th/20th September and 4 or 5 on 27th/28th September. Two killed at the light during the week 10th-16th September were shown by the master, J. W. R. Reeve, to H.E.A.

MEADOW PIPIT (*Anthus pratensis*).—Only on one day, 7th October, was any considerable diurnal migration observed. On this day, 148 Meadow Pipits were definitely identified and 100 more were probably of this species. The directions were: W.S.W., 28 birds in 2 parties ; W., 72 in 5 parties ; W.N.W., 42 in 2 parties ; and N.W., 6 in 1 party. On 11th and 12th October, 20 and 39 were seen respectively. Otherwise only in very small numbers, although they were recorded on 20 days throughout the period. Only rarely seen at the light.

STARLING (*Sturnus vulgaris*).—See Section (2).

GREENFINCH (*Chloris chloris*).—One caught on 5th/6th October was the only record.

REDPOLL (*Carduelis flammea*).—Two Mealy Redpolls (*C. f. flammea*) caught on 19th October. Distinctly grey-brown birds with very noticeable off-white rumps, off-white wing bars and whitish tips to the scapulars ; wing 75mm. ; bill 9mm. (J.H.R.B.). Redpolls were also recorded that day from the Haisborough and Corton Light-vessels.

CROSSBILL (*Loxia curvirostra*).—One recorded on 23rd and another on 26th September. Both birds provided interesting examples of assisted passage. The first arrived from the direction of a steamer passing on a S.W. course. After a short stay it flew off to another vessel proceeding N.E. but soon returned to the light-vessel. Presently, it flew across to a steamer going S.W. and was not seen again. The second bird arrived from and returned to a ship passing on a S.W. course (H.E.A.).

CHAFFINCH (*Fringilla coelebs*) AND BRAMBLING (*Fringilla montifrigilla*).—See Section (3).

SNOW BUNTING (*Plectrophenax nivalis*).—Two seen on 5th November; at least ten present at the light on 6th/7th November.

TREE SPARROW (*Passer montanus*).—One, 25th October.

(11) ACKNOWLEDGEMENTS

We are grateful to the Elder Brethren of the Corporation of Trinity House for permission to stay on the Smith's Knoll Light-vessel. We are greatly indebted to the masters and crews of the light-vessel for their hospitality, tolerance and not least to their kindness in bad weather. Also to Dr. Bruce Campbell and the Council of the British Trust for Ornithology for assistance with the preliminary arrangement and to Dr. J. M. Harrison for determining the sub-specific identity of specimens.

(12) SUMMARY

1. Observations on migration made from the Smith's Knoll Light-vessel from 15th September to 11th November are recorded.

2. The effect of wind direction and force on the direction and flock-size of Starlings is considered.

3. The direction and time of peak-migration is given for several species. It is found that the peak-period of migration is in accord with the theory that the main departure of Passerines from the Continent occurs at dawn.

4. A systematic list of all species observed is given and an attempt is made to correlate our observations with those on the mainland.

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RECORDS OF THE DEVELOPMENT OF ORIGINAL AND UNUSUAL FEEDING METHODS BY WILD PASSERINE BIRDS

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There is a widespread tendency among present-day students of animal behaviour to concentrate attention on the Fixed Action Patterns or "Instinctive Acts" as the most striking and important feature of animal behaviour. And indeed it is in general true to say that the bodily movements and actions of most species of animals, with the partial exception of the higher mammals, tend to be so highly stereotyped as to be characteristic of the species. This is obviously true of the Class Aves where whole groups can be classified on the characteristic style of their locomotory methods, which are usually beautifully adjusted to the details of bodily structure. It applies equally to the flying, hopping, walking and swimming of birds; the way in which they preen—the "higher" groups (most Passerines, the other five among the higher orders and some waders) scratch the head by bringing the foot above the wing, the remaining "lower" groups by bringing it underneath (Heinroth, 1930); or the way in which they catch their prey, eat their food, build their nests or display to their mates. Even song itself is, after all, the product of a highly specific series of actions of the vocal muscles. The ability quickly to distinguish species at a distance by recognizing the subtle specific differences of movement is indeed one of the first criteria of a good field-ornithologist and the perfection of this art is the first concern of many of the fraternity. So we find that most animals find it relatively easy to accommodate themselves to a change in habitat or circumstances and relatively hard to develop new actions. Thus birds not infrequently nest in strange situations or even build with strange materials, but they hardly ever build a nest of a really abnormal type because a different set of building actions would be required to do so.

For this reason examples of the production of original or unusual actions by birds, however small the change, are particularly worthy of study and of being put exactly on record. Perhaps we are over impressed by fixity and not sufficiently on the look-out for plasticity.

About twelve years ago I was asked by the Editors of *British Birds* to summarize for publication (Thorpe, 1945) a large number of letters which they had received describing unusual and apparently intelligent methods of feeding in birds. These had been elicited by an article of my own (Thorpe, 1943) dealing with the ability of several species of tits and of some other Passerine birds to pull up and hold strings to which food is attached, and the correspondence naturally dealt largely with this subject. Among the letters was one from a Mr. Trevor Miller of Riding Mill, Northumberland, who described how in 1938 he had suspended a conical tit-bell of the usual type, 3 inches in diameter, half-filled with fat. A fine string was hung centrally through the fat, its end being about 4 inches below the rim of the bell which was quite smooth. A light stick of balsa wood was tied firmly by its middle to the end of the string (Fig. 1). The second day after this improbable apparatus was put up, one or more Blue Tits (*Parus caeruleus*) failing to reach the fat by any other means, landed on the bar and, hanging in an inverted position, rolled the

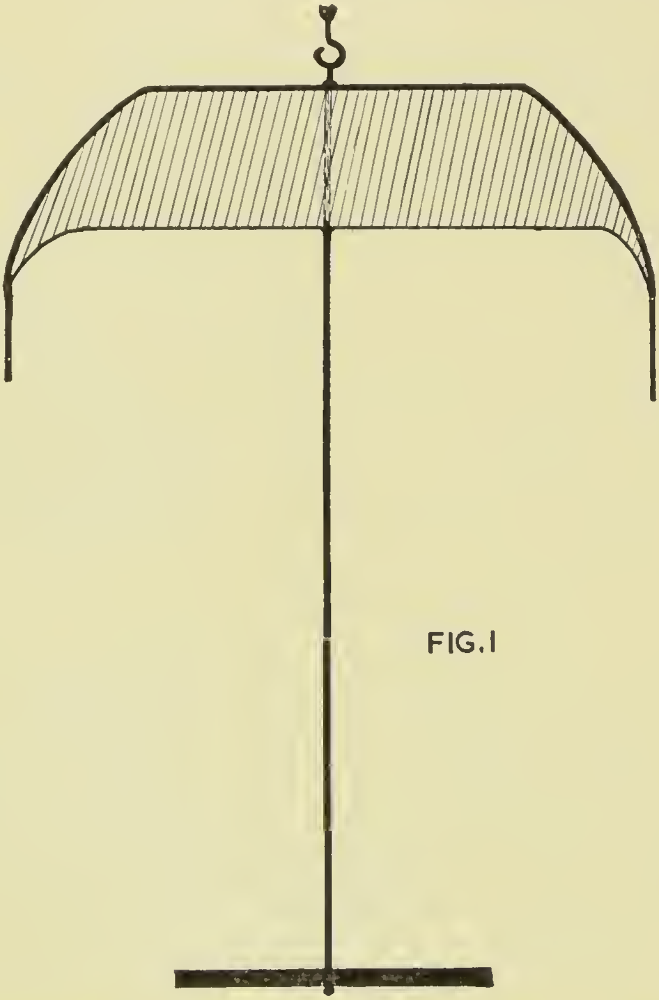

FIG. 1—CROSS-SECTION TO SHOW CONICAL TIT-BELL WITH A LIGHT BALSA STICK SUSPENDED ABOUT FOUR INCHES BELOW IT BY A FINE STRING

On this apparatus Blue Tits (*Parus caeruleus*) reached the fat, which half-filled the tit-bell, by hanging from the bar in an inverted position and rolling the bar up the thread with rapid movements of the feet.

bar up the thread with rapid movements of the feet and so reached the fat. Mr. Miller observed this process once or twice a day for several weeks and thought that more than one individual was concerned, though of this he could not be certain. Mr. Miller tried to repeat the experiment in another year, without success, and I myself and the late Mr. T. C. Wyatt independently did the same in Cambridge in 1944. Although our birds showed many resourceful and ingenious methods of attempting to reach the fat, none of them succeeded in performing this remarkable trick. In spite of this failure, in three independent experiments, to repeat Mr. Miller's observation, the original account was so convincing that I included a summary of it both in a review article (1951) and in a recent book (1956, pp. 338-339, Fig. 61).

FIG. 2

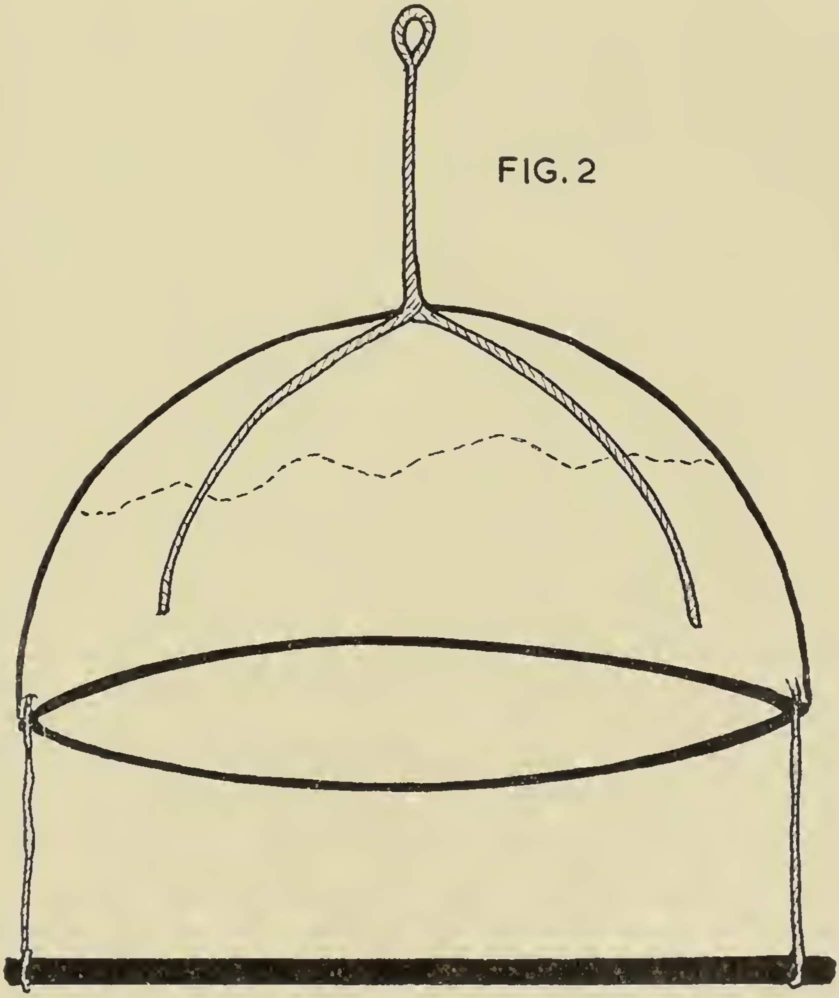

FIG. 2—DIAGRAM TO SHOW HALF COCONUT SHELL WITH A PERCH SUSPENDED BELOW BY A STRING AT EACH END

Here again Blue Tits (*Parus caeruleus*) reached the fat, with which the shell was charged, by alighting on the bar and twisting it up the string until it touched the rim of the shell.

It was thus with especial interest that I recently received from Mr. Stanley Anderson, C.B.E., R.A., R.E., of Towersey near Thame, Oxon., who had never heard or read of any mention of the subject, a full confirmation of the ability. Mr. Anderson, not being an ornithologist, declines to publish the details himself but asks me to do so for him.

Mr. Anderson has for many years attracted birds to various feeding-devices in his garden. One of these devices consists of empty half coconut shells, charged with run-down fat. Early in 1956 a Blue Tit was seen to alight on the bar beneath one of these shells in which the fat had been pecked away towards the top so that it could hardly be reached from the bar by so small a bird. Mr. Anderson describes how the Blue Tit alighted on the perch—which, as Fig. 2 shows, was 3/16 in. thick and was suspended from each end—"and suddenly proceeded to twist it up the string till the bar contacted the rim of the shell. Always its claws moved so fast that one could hardly see their movement". On the first day this performance was observed, Mr. Anderson feels satisfied that, though the birds were not colour-ringed or otherwise marked, only one was concerned, but later "we certainly feel that more than one rolled up the perch for we noticed, after the first day, that whilst one had rolled up the perch, fed and flown off, another waiting near-by hopped on and did the same". The habit appears to have continued until the end of the feeding-season in April, that is a period of some weeks, though presumably during that time the fat was not always so far pecked away that a simpler method of feeding would not have served. It looks as if it became a habit which was used even when sometimes unnecessary.

Since more than one bird was almost certainly concerned, it is difficult in this case to avoid the conclusion that some element of imitation may have been involved. However, there is no need to assume any insight or intelligent understanding of the problem and the means of solving it, on the part of the tits. In my own experiments, the birds, in their attempts to get at the fat, would sometimes stand on the bar and with a rapid stepping movement execute little fluttering jumps upwards, sometimes carrying the bar a little way with them. Such a performance shows, I think, how a bird such as a Blue Tit, which is in any case habitually hanging from twigs and righting itself, might accidentally roll the bar up a little way and so find itself nearer the food. A very small development of the action pattern might thus suffice. Tits are rapid learners in many situations—see, for instance, the experiments of Brooks-King (1941, 1956)—and it is consonant with other observations on Blue Tits to suppose that the bird would quickly perceive the advantage accidentally gained by the new action and repeat it until full success was achieved. That is to say, it is an example of Trial-and-Error Learning, of which Instrumental Conditioning or Type II Conditioning is, in the strict sense, the basis (see Thorpe, 1956), and not an example of Insight Learning.

During the hard weather of February 1953 I observed for the first time, in my garden in Cambridge, a Robin (*Erithacus rubecula*) successfully hanging on underneath a tit-bell and feeding on the fat just in the manner of tits. This appeared to me a very unusual action for I had made observations on and off for years on the feeding techniques of Robins and other species and had never seen anything like this before; nor should I have expected that a Robin, which incidentally does not use its feet in feeding, would be capable of doing such a thing. I then found that Mr. Wyatt, who had been closely observing the feeding behaviour of Robins in his Cambridge garden for many years, had observed it for the first time a year or so before. This fact, and the publication in *The Times* of 7th February 1953 of a short article mentioning other somewhat similar examples of Robin and House Sparrow (*Passer domesticus*) behaviour, led me to wonder whether a new habit was developing. Inquiry through the kindness of the British Trust for Ornithology and the assistance of the Editors of *British Birds,* who handed over much unpublished correspondence, has led to the accumulation of a number of new records which it seems appropriate to summarize briefly here.

With regard to the Robin, four main points emerge. *Firstly,* the habit is widespread. *Secondly,* it is not new. Thus Mr. F. J. Ramsay of Kilbarchan, Renfrewshire, sent detailed notes made in 1944 of occasional records going back to 1930 but had not observed it during the years 1944-1953. Mrs. D. F. Bucksey of Hambledon, near Portsmouth, Hampshire has observed it "for years" prior to 1953. *Thirdly,* there is slight evidence of there having been a fresh outburst of the activity in 1953, perhaps associated with the severe weather and the stimulus of acute food shortage. Thus there are three records of its occurrence prior to 1953, six in 1953, and two in 1954. *Fourthly,* there is some evidence that, where it occurs, more than one bird is concerned and that individuals improve by practice and start the habit by watching others. If example is of assistance to a newcomer this does not itself prove true imitation: it may merely be that the attention of the bird is drawn to the food source (local enhancement) and that it then learns the trick in the same way as did the first bird. Evidence for true imitation of a new action (as distinct from mimicking a sound) is hard to secure in animals. Apart from the apes, convincing evidence of learning a new manual skill by watching the *learning process* (rather than the finished action, which may be less instructive) has as yet only been provided for cats (Herbert and Harsh, 1944). Mrs. Bucksey had three clearly distinguishable Robins performing at the same time in January 1954, and Lt. Col. W. M. Logan Home of Duns, Berwickshire, had a colour-ringed male and a non-ringed female feeding in this way in April 1954. In February 1955 a third Robin, a newcomer of unknown sex, started jumping up at the fat after two weeks of association with a Blackbird (*Turdus merula*), which (the only record) had learnt to hang suspended, and a Hedge Sparrow (*Prunella modularis*), which took the food while hovering below the bell. Mr. Ramsay, after describing the unsuccessful attempts of a particular Robin first observed on 20th February 1944, adds: "Each day thereafter, with much practice, it gradually improved, had fewer and fewer failures, and by early March was flying up to the bell, grasping the bar and feeding upside-down with surprising ease and speed—exactly like a tit".

There remain to be mentioned a few other records of interest. That a bird such as a Greenfinch (*Chloris chloris*), which feeds on a variety of small seeds, should be capable of this is less surprising, though the only record I have is one from Miss M. R. Jellicoe, of Bournmouth, who describes its occurrence at various times in the period 1947-1951, three individuals having on one occasion been seen feeding together in this way. Records for the Chaffinch (*Fringilla coelebs*) are rather more surprising. Thus Mr. D. C. Hulme, of Littleover, Derby, describes a female clinging to a vertical cotton thread by which a bone was suspended, and another female making an unsuccessful attempt on the same day (22nd January 1955). Lt.-Col. Logan Home sends the only fully documented record for a male Chaffinch feeding by "hanging on the fat," on 23rd February 1956, "after watching tits and a Blackbird doing the same for ten minutes."

There are occasional records for House Sparrow. Mr. N. Holmes Lambert, of Hull, records this species on an unspecified date, hanging on like a tit, and Mrs. H. Rait Kerr says that she found House Sparrows and Starlings (*Sturnus vulgaris*) successful in London but not at Amersham, Bucks. Mrs. G. H. Austin of Harnham, Salisbury, Wilts., describes a successful performance of a Starling at fat in 1953.

Finally it remains to thank the Editors of *British Birds* and Dr. Bruce Campbell of the British Trust for Ornithology for their good offices and, in addition to all those mentioned above, the following who sent in records: Mr. M. A. Arnold, Tamworth, Staffs.; Mr. C. H. Hunt, Blakeney, Norfolk; Miss J. Kinchin-Smith, Oxford; Mr. D. J. Simkin, Great Wyrley, near Walsall, Staffs.; and Miss F. Westlake, Farmoor, near Oxford.

I hope this little paper will have made clear the interest of the subject and will encourage others to make further and more detailed observations. It is important to study such behaviour in wild birds as well as those in aviaries and, since it is rare, the only possible way of accumulating any quantity of information about the former is with the help of amateurs widely spread throughout the country. But I would like to emphasise again that one fully documented and careful observation which refers to an

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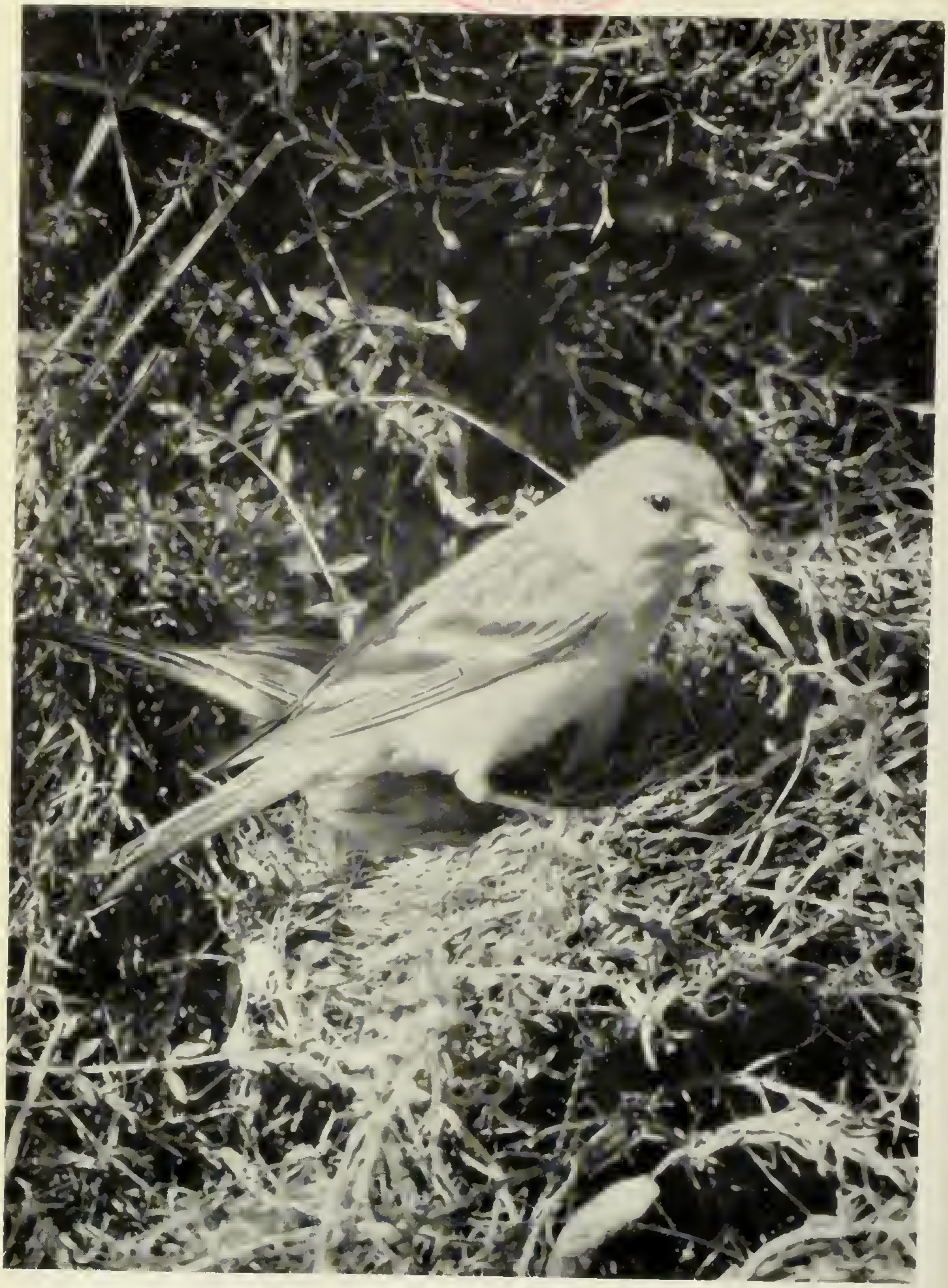
HABITAT OF CITRIL FINCH (*Carduelis citrinella*): SARDINIA, JULY 1953

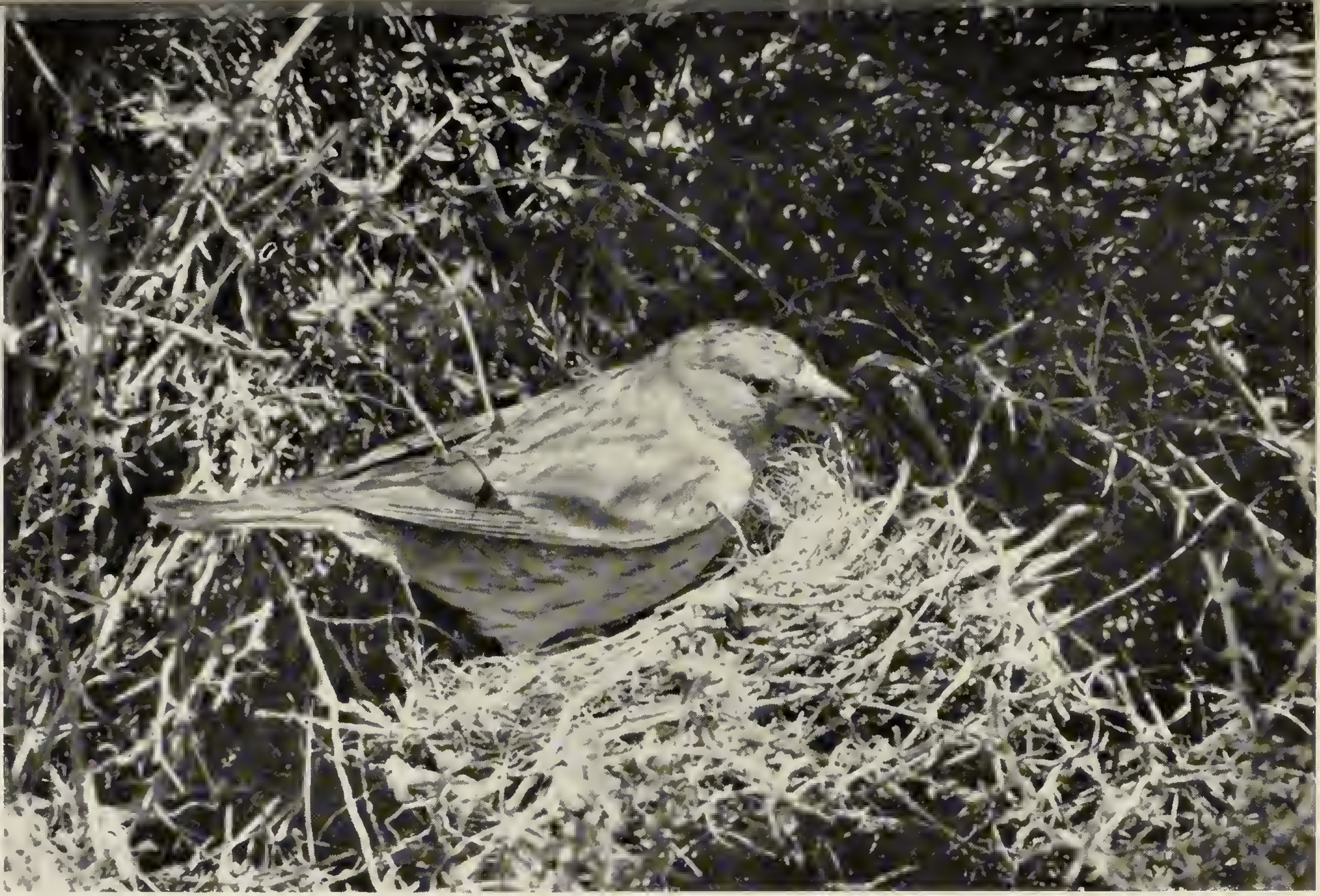
The Citril is a mountain bird, and the Corsican/Sardinian race (*C. c. corsicana*) breeds almost exclusively in scrub. This shows the hide from which the accompanying photographs were taken, in a typical habitat for Sardinian Citrils—on a high ridge (5000-5500 feet) in the Gennargentu Mountains: an open rocky area, with mostly genista scrub, well above the distant open oak-forest which there forms the tree-limit (see page 399).

PLATE 54



R. Vaughan

MALE CITRIL FINCH (*Carduelis citrinella*): SARDINIA, JULY 1953
The male here is bringing food to the brooding female, just visible behind. This is a tiny greenish bird, the male characterized by plain yellowish underparts, grey on the nape and the sides of the neck, a distinctive wing-pattern of green and blackish, and a pale greenish rump. Those in these plates, however, are of the Corsican/Sardinian race (*C. c. corsicana*) which is paler below and has a streaked, brown mantle (see page 399).

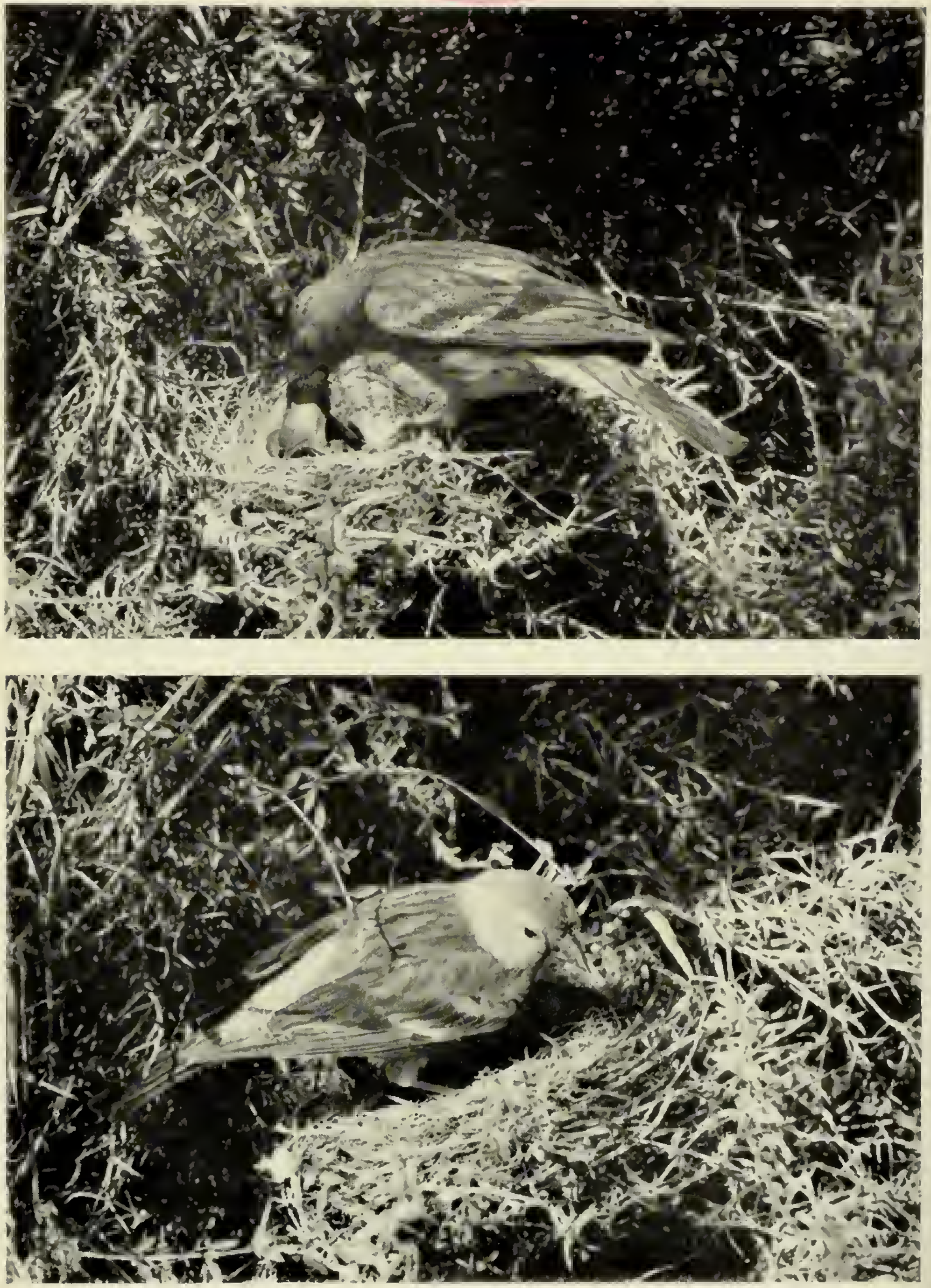


R. Vaughan

FEMALE CITRIL FINCH (*Carduelis citrinella*): SARDINIA, JULY 1953

The female is duller than the male and, particularly in the Corsican race (*C. c. corsicana*), more streaked above and on the flanks. The nests of the typical form are usually in coniferous trees, 10-40 feet from the ground, but this island race builds almost exclusively in scrub (genista and tree-heath), from nearly ground-level (as here) to about 6 feet up (see page 400).

PLATE 56



R. Vaughan

FEMALE CITRIL FINCH (*Carduelis citrinella*): SARDINIA, JULY 1953

The lower photograph shows the pattern of the female very well and particularly illustrates the species' green-yellow rump and the double green bars on the blackish wings. Seeds—of fir and spruce, dandelion, grasses, etc.—form the staple food, but the buds and tender shoots of flowing shrubs are frequently stripped off and at blossom time apple buds are much favoured; insects are also taken.

identifiable individual and gives, as far as possible, exact information on all the relevant circumstances is worth ten more casual accounts. Cinematograph records would be of great interest.

SUMMARY

1. The importance of making precise observations on abnormal actions and patterns of movement in wild birds is emphasized.

2. A remarkable new example of a Blue Tit (*Parus caeruleus*) learning to wind up a suspended perch on its string and so reach food is described. This is regarded as an example of Trial-and-Error Learning, not of Insight.

3. A number of recent examples of Passerine birds learning to hang on to vertical and horizontal strings and feed on bait in an inverted position are analysed. These concern Robin (*Erithacus rubecula*), Blackbird (*Turdus merula*), Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), Greenfinch (*Chloris chloris*) and Chaffinch (*Fringilla coelebs*): all species which do not normally feed in such a posture and which rarely, if at all, use the feet in feeding.

4. The records show that the habit is widespread and is not new, but suggest that it may have become more prevalent in recent years. In some species it appears to be related to extreme food shortage and there is some evidence that observation of one successful individual, even if of a different species, may assist a newcomer in learning a new feeding technique.

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NOTES ON SELECTED MIGRANTS AT CAP GRIS NEZ, NORTH FRANCE, IN 1955

By Philip S. Redman

During the course of 1955 the writer visited Cap Gris Nez, Pas de Calais, on the north coast of France, to examine the nature of the migration which occurs on this important headland. Altogether three visits were made, the first, during 8th-11th April, the second, accompanied by Mr. J. N. Hollyer, during 9th-12th September, and the third, accompanied by Mr. J. F. Naylor (J.F.N.) during 2nd-9th October. I am grateful to these gentlemen for their assistance.

The name Cap Gris Nez is known throughout the British Isles not only for the fact that it is the starting point for cross-Channel swimmers but also for the notoriety it achieved during the last world war. It lies only 21 miles from the South Foreland on the Kent coast.

From the ornithological standpoint the area has been neglected and a preliminary search for published references has only yielded one, namely van Dobben (1944), who visited the area in the late autumn of 1933. In recent years the area has become of considerable interest to ornithologists as the final link in the chain of points of observation along the North Sea coasts of the British Isles, Europe and Scandinavia. Although all the visits in 1955 were exploratory a considerable amount of useful data was collected which has been filed for future reference; this being considered insufficient for analysis at the present time. In future years it is hoped to make more frequent observations with a view to completing the picture of the migrations in the North Sea and east Channel areas.

It is thought that the following selected notes will be of particular interest to British ornithologists and will, at the same time, give them some idea of the volume of migration which occurs only twenty odd miles from the nearest point of the British Isles. It may be added that verbatim reports from observers on the adjacent Kent coast during the October visit showed no correlation so far as sea-birds were concerned and very little correlation with the observed Passerine movements.

By the end of the October visit 111 species had been recorded in the area and it was estimated that some 100,000 migrants were counted, most of which were primarily diurnal-type migrants.

SYSTEMATIC LIST

Black-throated Diver (*Gavia arctica*).—One, flying to the S.W. off the Cap, on 2nd October.

Storm Petrel (*Hydrobates pelagicus*).—Two identified close inshore by J. F. N. on 7th October.

Manx Shearwater (*Procellaria puffinus*).—A single bird on 6th October and a further 12 on the 7th were of the nominate form. On the afternoon of the 7th an example of the Balearic form *mauretanicus* was seen under favourable conditions and later two similar birds were seen but not positively identified. In all cases birds were flying in a westerly direction.

SOOTY SHEARWATER (*Procellaria grisea*).—A single bird on 6th October and two on the 7th were all flying to the west.

GANNET (*Sula bassana*).—A westerly movement on 7th October involved 200-300 birds of all ages.

EIDER (*Somateria mollissima*).—A 1st year ♂ and 10 ♀♀ off the Cap on 9th April, and a single bird on 12th September. (In early April 1956 a flock of 121 was seen.)

GOSHAWK (*Accipiter gentilis*).—A single bird which arrived from the E. on 2nd October flew off to the S.E. A day of heavy migration.

MARSH HARRIER (*Circus aeruginosus*).—Immature birds seen on 10th September and 8th October.

DOTTEREL (*Charadrius morinellus*).—Two flying S. over the Cap on the 2nd October.

ARCTIC SKUA (*Stercorarius parasiticus*).—About 30 recorded on 7th October flying to the west. Largest party 5.

POMARINE SKUA (*Stercorarius pomarinus*).—Single birds off the Cap on 10th September and 2nd October.

LARIDAE.—A steady movement on 7th October consisted chiefly of Lesser Black-backed Gulls (*Larus fuscus*), with smaller numbers of Great Black-backed (*Larus marinus*), Herring (*Larus argentatus*), Common (*Larus canus*) and Black-headed Gulls (*Larus ridibundus*). All were coasting to the south. There were many fewer on the 8th. An adult Little Gull (*Larus minutus*) off the Cap on 2nd October.

KITTIWAKE (*Rissa tridactyla*).—A heavy movement to the west on 7th October when probably more than 1,000 birds passed the Cap.

ROSEATE TERN (*Sterna dougallii*).—One fishing off the Cap on 11th September.

BLACK GUILLEMOT (*Uria grylle*).—One flying to the west on 7th October.

HOOPOE (*Upupa epops*).—One on 10th September.

CRESTED LARK (*Galerida cristata*).—A bird which was almost certainly a migrant flying south on 2nd October. Pairs were located in the area on 4th and 7th October, but none was seen on the earlier visits, nor in early April 1956. (It seems opportune to remind observers in Britain, particularly on the south-east coasts, that all larks are worth a second look!)

JAY (*Garrulus glandarius*).—About 400 coasting to the south on 2nd October, the largest flock being 200 strong and ¾-mile long. A smaller movement on the 8th.

FIRECREST (*Regulus ignicapillus*).—A ♂ at the Cap on 4th October.

STARLING (*Sturnus vulgaris*).—Small W.N.W. movements in April and October. Largest movement on 9th October but numbers did not exceed 3,000.

CHAFFINCH (*Fringilla coelebs*).—Large numbers of migrants in October culminating in about 20,000 on the 8th. Several thousands went out to the W.N.W. on several days, but the majority coasted south.

TREE SPARROW (*Passer montanus*).—Numbers up to 3,500 recorded in October; many attempted to fly W.N.W. but few succeeded and apart from a "resident" flock of 300 all coasted south.

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PHOTOGRAPHIC STUDIES OF SOME LESS FAMILIAR BIRDS

LXXIV. CITRIL FINCH

Photographed by R. Vaughan

(Plates 53-56)

The Citril Finch (*Carduelis citrinella*) is restricted as a breeding bird to the mountain ranges of southern Europe—N.E. and S.E. Spain (chiefly Pyrenees, Sierra de Guadarrama and Sierra Nevada), S. France (Massif Central, Pyrenees, Vosges, Jura, Alps), S. Germany (Black Forest), S. Austria (Tirol), Switzerland (Alps) and N. Italy (Alps and Appennines)—and to the islands of Corsica and Sardinia. In most of these areas it is decidedly local, even if numerous in favoured habitats. Except in Corsica and Sardinia, where it is commonly found down to 2000 feet and where in some places it nests in the coastal scrub not much above sea-level, the Citril Finch is mainly found above the 4500-foot mark, though in a few areas, for example parts of the Black Forest, it breeds as low as 2000-2500 feet. In winter, however, particularly in bad weather, it descends to some extent from the higher ground and is not infrequently recorded in central and southern Italy, on the Mediterranean coast of France and in various parts of southern Spain; it is, nevertheless, mainly a resident and records outside these areas are few and far between, though it has been noted in North Africa, Sicily, Heligoland, Belgium, Holland and England. The solitary British record is of an adult female caught at Yarmouth, Norfolk, on 29th January 1904.

The Citril is a tiny finch, smaller than a Redpoll (*C. flammea*) and only a little larger than a Serin (*Serinus canarius*), though rather more like a Linnet (*C. cannabina*) in shape. It is a predominantly yellowish-green bird, and as such is most likely to be confused with the Serin and the Siskin (*C. spinus*), which, however, mostly nest at lower altitudes. Both these birds are, on the other hand, rather yellower in general appearance, and very much more streaked above and on the sides and flanks, thus lacking the Citril's rather clean looks. The male Citrils, in fact, and many females, have completely uniform clear yellow under-parts and these, coupled with a bluish-grey colour on the nape and the sides of the neck, make them quite distinctive in a good view. In addition, this species has a greenish-yellow rump (well shown in plate 56, lower) which is conspicuous in flight, but which does not stand out to the same extent as the bright yellow patch on the Serin, while the Siskin shows clear yellow at the sides of the tail as well. A further separation from the Serin is the rather Siskin-like pattern formed by two dull green bars on the blackish wings (see particularly plate 56). Also, of course, the male Siskin has black on the crown and chin, and the male Serin gives the impression of having a much yellower head. The Citril's horn-coloured bill, best shown in plate 56 (lower), is not so short and stubby as the Serin's, nor is it so long as the more delicate bill of the Siskin. The female Citrils (compare plates 55 and 56 with 54) are duller, more streaked above than the males and sometimes, as here, have a little streaking on the sides. Juveniles are very much more difficult to identify, since they are brown above, brownish-grey below, well streaked, and lack all traces of greenish, which, however, they begin to assume as they moult into first-winter plumage; a double wing-bar is nevertheless present in the juvenile, though it is buff, not greenish like the adult's. It might be added that a Citril in Britain would have to be distinguished not only from Serin and Siskin, but also from the small, green African finches—like the Green Singing Finch (*S. mosambicus*) (see *antea,* p. 345)—which are commonly imported by aviculturalists.

Mr. Vaughan's photographs were taken in the Gennargentu Mountains in Sardinia and it must be emphasized now that the Citrils of Corsica and Sardinia form a very clearly separate and quite distinct race—*C. c. corsicana*—with a more streaked, warm rusty-brown mantle taking the place of the fairly uniform (faint shaft-streaks only) olive-green mantle of the typical birds, and with paler and yellower under-parts, particularly in the male, which give the bird a more contrasted appearance (plate 54); in addition, the female seems to be more streaked on the sides. Photographs of Citril Finch have been published before in *British Birds,* as long ago as 1937 (*antea,* vol. xxxi, pp. 98-100, plates 3-4); these were also taken in Corsica, by Mr. John Armitage, and the male shown there illustrates how uniformly pale that race can look when the under-parts and head alone are seen.

The Citril has a range of typically cardueline notes, of which the commonest is a rather Siskin-like, clear, plaintive "tsi-ew", but it also has a quite distinctive, metallic flight-note "tweck" which, rapidly repeated, becomes a slightly nasal whinnying twitter. The song is mainly sweet and musical, with a rather liquid quality that separates it from that of the Siskin, though at times twittering and nasal notes recall that species; it is much less monotoness than the Serin's jingle. It consists chiefly of short phrases interspersed with canary-like notes and is usually uttered in circling song-flight with slow wing-beats and spread tail.

As already stated, the Citril is a bird of the mountains; it perches equally freely on trees, scrub, rocks, and also spends much time on the ground, slipping among the vegetation in search of food. In most of its range it inhabits the edges of coniferous forest, particularly spruce (*Picea*) and silver fir (*Abies*), or where there is a scattering of such trees on scrubby or rocky ground, but it also extends above the tree-limit and one type of habitat is shown in plate 53, which was taken at 5000-5500 feet in an area of scrub, mostly genista, and rock on a high ridge in the Gennargentu Mountains; the nearest trees, in this case open oak-forest, can be seen in the distance, at a lower level. Habitats of this kind are commonly used by Citrils in Corsica and Sardinia and in fact in that part of the bird's range there is often little association with trees. The nest shown in these photographs (plates 54-56) is typically sited as far as the birds of the Corsican race are concerned—in genista scrub a few inches above the ground. In Corsica and Sardinia indeed, even if there is a good scattering of trees in the habitat, it is very rare to find a nest in a tree, most being placed, Linnet-like, between 6 inches and 6 feet up in scrub, particularly in tree-heath (*Erica arborea*) and genista, but also in such as bramble. Photographs, taken by Armitage, of typical Corsican haunts were published with the article already referred to (vol. xxxi, plate 3). Over the majority of the bird's range, however, the nests are built in spruce and silver fir, between 10 and 40 feet above the ground, sometimes against the trunk, sometimes out along the branches, but not showing the Siskin's liking for the tips of high branches. The rather Serin-like nest, built by the hen alone, is usually a small, fairly neat structure of various plant-stems, grasses and roots, mixed with varying quantities of moss and lichen, and sometimes founded on a few conifer twigs or small pieces of dead scrub, lined with fine roots, vegetable down (particularly thistle), hair and feathers. Several nests may be found in quite a small area, for this is a sociable bird. The breeding-season starts in mid-April to early May in different areas, but it is probable that two broods are not infrequently reared. Mr. Vaughan's photographs were taken at the beginning of July and it seems likely that this nest which contained 3 eggs, 1 chick (and a broken egg near-by) was a second brood; likewise another nest with 3 eggs and 1 newly-hatched young, found at the same time. I.J.F.-L.

GULLS FEEDING ON GRAIN

By T. A. W. Davis

During the third week in August 1955, gulls frequented a field overlooking the Dale Estuary in St. Ishmael's, Pembrokeshire. They spent the whole day there, and fully three acres where they assembled were littered with patches of corn husks, each patch being a disintegrated pellet. I was of the opinion that the pellets were deliberately broken up by the birds, as in many cases they were still moist. The field had recently been sown with rape, and in the very dry weather remained bare for some time. The gulls passed the time resting: a large proportion were usually sitting down. The gulls were in full moult, the ground being strewn with feathers. Lesser Black-backed Gulls (*Larus fuscus*) were always in the majority, usually 80 per cent or more of those present, and most of the remainder were Herring Gulls (*L. argentatus*). A few juveniles were always present, and sometimes Great Black-backed Gulls (*L. marinus*), which did not appear to remain long. The flock was usually between 200 and 300 strong.

About the beginning of September the daytime roost moved into the next field but one, which had been dressed and sown with rape a little later than the one first chosen. Up to 100 gulls still resorted to the first field occasionally, perhaps when disturbed in the other. On 6th September at about 16.00 hours I estimated that there were 800 gulls, fully 80% per cent of them adult Lesser Black-backs, in the second field. The next day out of more than 200 gulls there, ten were juveniles, ten Herring Gulls, the rest all Lesser Black-backs. The area littered with pellets was four or five acres.

At 18.30 hours on 11th September there were 150 to 200 present where the same number had been seen at midday, and I watched them leave to go to roost. A few, mostly Herring Gulls, rose at 18.35, and were soon followed by small parties of Lesser Black-backs. There had been much calling when I arrived, and the clamour intensified as each party left the flock. Some birds, after rising and flying round, settled again. At 18.40, with half the sun below the horizon, all that remained rose together in a flock about 50 strong, and headed, as those already gone had done, towards Middleholm and Skomer Island about six miles away. The next day I visited the place several times to see the flock build up. At 06.25 there were 4 Herring Gulls, at 08.45 about 15 each of Herring and Lesser Black-backed Gulls, and at 09.15 about 100 gulls; at 16.30 there were about 200, mostly Lesser Black-backs. It is therefore probable that at this season many feed only once, in the morning, and then rest at a daytime roost till they leave for their night roost.

From about this time they began to spend less time at the resting-places, and the numbers decreased, but they did not entirely desert them for at least another ten days. On 16th September there were only a few fresh grain pellets, and on the 19th there were none, though at one time during the morning between 150 and 200 gulls had been present. Early the same afternoon hundreds, including some Lesser Black-backs, were bathing at a favourite place in the stream of the estuary.

I thought at the time that the probable reason for the birds' spending so much time idling at daytime roosts was the effect of the moult. Most Herring Gulls then had gaps in their wings: the Lesser Black-backs had not, but they, too, were moulting their body-feathers. A more likely explanation has been suggested by P. J. Conder (*in litt.*) who saw similar flocks, which included Scandinavian Lesser Black-backs (*L. f. fuscus*), on Skokholm. He points out that the time coincides with the main passage of Lesser Black-backs down the coast, and thinks the flocks consist of migrants with some resident birds. This would account for

Lesser Black-backs being present in so much greater numbers than Herring Gulls, and for the fluctuation in the size of the flocks from day to day.

While the gulls were spending so much time idling in the two bare fields I saw none on several stubble fields within sight of my house in the early morning. Perhaps they fed on the first stubbles they came to on their way from their roosts on Middleholm and Skomer, or on their passage from the North. On 25th September, in a field near-by with wheat, barley, and oat stubbles, there were about 14 gulls on the barley stubble at 09.20 hours, two or three of them Lesser Black-backs, the rest Herring Gulls. In the same field on 3rd October about 40 birds were present at 07.00, mostly adult Herring Gulls, two adult Lesser Black-backs, and a few juveniles of either or both species. They were concentrated at the spot where the corn had been threshed, and a few only were dispersed on the adjacent barley stubble. By this time most of the Lesser Black-backs had already left the district.

Rintoul and Baxter (1925) and van Someren (1930) record instances of Herring Gulls in Fife taking corn from stooks even to the extent, in the case of a field cut very early, of eating practically all the grain in it. Had any such thing occurred with the gulls I was observing, I must have heard of it.

Of the thousands of pellets seen in the two fields where the moulting gulls rested, practically all were entirely of corn husks, the grain having been digested. One pellet of undigested oats was seen on 30th August, and several of whole barley on 16th September. A few, a dozen or so in all, consisted of crab-shell and fish-bones, one of the bones and feathers of a small Passerine bird, and one grain pellet contained a small limpet-shell. On three occasions pellets of gulls' feathers were found. These were almost certainly produced as a result either of moulted feathers being picked up off the ground, or swallowed in preening. P. J. Conder (*in litt.*) found similar pellets on Skokholm. The only whole pellet of corn husks found was obtained when I walked up to the resting gulls. One Lesser Black-backed Gull disgorged a pellet as it rose, and this was undamaged: it was oval, tapering sharply to a point at both ends, and measured 73 x 33 mm. It did not break up when dry. Samples of pellets were examined by H. A. Hyde, Keeper of the Department of Botany at the National Museum of Wales, Cardiff, who found one or two grains of oats still enclosed in husks, and the rest of the material almost entirely of pieces of oat-husk split down longitudinally.

At places on the shore of the estuary where gulls assemble and rest in the daytime, pellets are rarely found. A pellet of grain husks was seen on the pavement in the town of Milford Haven on 30th August.

On Skokholm, Pembrokeshire, Conder (1952) saw corn-pellets which consisted largely of whole viable grain, but these were few compared with what he saw on the Inner Farnes, Northumberland, in late October 1952, where "over large areas of this island there was a pellet every yard". He attributes (*in litt.*) their abundance on the Farnes to the fact that this is an important winter roost, whereas on Skokholm the birds are leaving the island by harvest. The pellets he saw were not broken up when fresh as were those in the fields where I found them so abundant. Gillham (1952) found grain pellets on Skokholm from May to November, and saw them as far at sea as Grassholm. In August 1952, when they were unusually abundant on Skokholm, most were of sound grains. On 25th August she found forty to fifty pellets of whole corn on Middleholm (a regular winter roost). On the Isle of May, Rintoul and Baxter (1925) found quantities of gull castings on the North Ness, composed entirely of corn, which could be attributed definitely to Great Black-backs. It cannot be doubted, in view of the observations brought together here, that all three resident species of large gull at times take grain on a considerable scale, even to such an extent that it may be their staple or only diet for several weeks on end. In *The Handbook* grain is given as being among the foods taken by all three species, but the percentages do not suggest that it is sometimes a principal food.

There is not enough evidence to establish whether gulls take to grain as a staple diet every autumn, or only in some years. It is reasonable to suppose that the habit is irregular, otherwise it would surely be better known. Large numbers of gulls in the district in which I made my observations obtain most of their food foraging on grassland and following the plough. In very dry weather, as in the late summer of 1955, earthworms would not be obtainable, and this might cause them to take to corn rather than seek their food in a different type of habitat. Birds on passage can be expected to join resident gulls feeding in cornfields, and after feeding they may together resort to suitable places to rest. Other problems that arise from the observations presented in this note are: why is the corn taken sometimes digested and at others ejected whole and viable? and why are grain pellets sometimes found whole and at others, as in my own observations, only in a disintegrated state? The subject calls for further study by field-observers.

ACKNOWLEDGEMENTS

I am greatly indebted to P. J. Conder for information additional to that contained in his paper on the feeding habits of gulls, and for important criticisms and comments. I am also grateful to H. A. Hyde for examining and reporting on samples of castings.

SUMMARY

The behaviour of gulls, chiefly Lesser Black-backs, at daytime roosts is described and it is shown that for three or four weeks

their food was almost exclusively corn. Other observations on gulls taking grain are cited from the literature and compared with those of the writer.

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REVIEWS

LOCAL REPORT REVIEWS

YORKSHIRE NATURALISTS' UNION: ORNITHOLOGICAL REPORT, for 1953 (26 pages), and 1954 (27 pages). Editor: R. Chislett, Brookside, Masham, Nr. Ripon. Price 2s. each.

THE very full and detailed systematic lists of 22 pages reflect the great ornithological activity within this enormous area, and the wide local knowledge of the editor. There seems to be good coverage in all parts of the county and many species are thoroughly treated: the summaries of the records of Pink-footed and Canada Geese, Whooper Swans, certain wintering ducks and waders, and of the migration of Swifts, Hirundines and some other Passerines, are particularly interesting. Each Report contains a brief introduction which might well be extended: many significant occurrences pass without comment, and some interesting information is given under species headings, which would be much more valuable to the non-Yorkshire reader if it were brought together into an informed general summary of the year's events. The Wetmore order is adopted in 1954, and in this Report there is also a list of species known to have occurred during the year but not included in the classified list: this contains such species as Red-legged Partridge, Rock Dove and Marsh Tit, which the lay reader might otherwise think to be rare.

A few records of rare birds are supported by full details, but a number of others are published without any qualification, and some (presumably on account of shortage of space) are supported by brief notes of a few words only. This last procedure is perhaps worse than giving no description at all, for it is apt to give the impression that the bird concerned was identified (and accepted) solely on the basis of the description that is published. In the 1953 report, for example, records are given of a Great Shearwater, described only as "a large shearwater showing warm brown back and wings in contrast with white body underparts and whitish underwings", and of a male Cirl Bunting identified by "the greenish head and dark bib''; these do not increase the reader's confidence in other records published with inadequate descriptions, such as an immature Pomarine Skua which was described only as resembling exactly a museum specimen, or the Sabine's Gull of which the only significant plumage character given was ''a very distinctive amount of black on the wings''. If the birds are satisfactorily identified it would even be preferable in such cases to give no details at all: certainly no shortened description can carry much conviction unless it is clearly stated that *full* details were considered by the editor. The 1954 report shows some improvement in this respect, as is reflected in the formidable list of records published, for various reasons, in square brackets—including albatross, Sooty Shearwater, Red-crested Pochard, Goshawk, Gyr Falcon, Red-footed Falcon, Ivory Gull, Caspian Tern, Wallcreeper and Tawny Pipit. Some of these records could profitably have been omitted, however, and there are still a few others which do not appear very satisfactory.

The species mentioned in the 1953 list include:— One Black-throated Diver. A White-billed Diver on 18th February (*antea,* vol. xlvi, p. 214). The three rarer grebes on several occasions. 2 Manx Shearwaters inland in September. 4 Sooty Shearwaters at Spurn on 10th September are well described, but a Great Shearwater there on 18th August is not. Fulmars ''more numerous than ever''. 2 Gannets inland in autumn. 2 Bitterns in winter. Garganey present in summer. Up to 97 Goosanders together, and small numbers of Smew regularly. 5 Brent Geese reported over the Ingleton Fells in January. Up to 9 Bewick's Swans. 3 pairs of Buzzards raised two broods. A reported Goshawk is square-bracketed. 2 Marsh Harrier records, and several Montagu's, including one nest. Osprey in March and May. Black Grouse were reported to have had a poor season. One Quail nest, and two autumn bevies, among other records (*cf. antea,* pp. 161-166). A pair of Spotted Crakes on 27th April is given without even the name of the observer. A number of nesting Corncrakes. Oystercatchers bred in the Sedbergh area and in many of the Dales. 7-9 pairs of Little Ringed Plovers bred (*antea,* vol. xlvii, p. 203). Dotterel reported in May, June and August. Green Sandpipers in both winters. Two Great, two Long-tailed and one Pomarine Skua (see above) seen in autumn; another Pomarine recorded for 1942. Two pairs of Great Black-backed Gulls bred in west Yorkshire. Little Gull on 3rd May; Sabine's Gull on 29th September (see above). Yellow-billed Cuckoo in November (*antea,* vol. xlvii, p. 273). An autumn Hoopoe. Shorelarks at both ends of the year. 2 pairs of Ravens bred unsuccessfully in the N.W. A Nutcracker is well described near Doncaster on 25th September. Several singing Nightingales. A Bluethroat at Spurn on 7th October. Waxwings January-March and in some numbers (up to 40-50) in November and December; one was recorded as of the eastern race *Bombycilla garrulus* *centralasiae,* but this race is not accepted by the B.O.U. Taxonomic Sub-Committee (see *Bull. B.O.C.,* vol. 72, pp. 13-14 and *Ibis,* vol. 98, p. 166). The Crossbill irruption is well-documented (*cf. antea,* pp. 289-297). A pair of Cirl Buntings is recorded near York in spring.

In the 1954 report we note the following:— All the inland records of divers are noted as coinciding with stormy weather. 288 Red-throated Divers passed Spurn in an hour on 18th December. A number of records of Red-necked, Slavonian and Black-necked Grebes. 4 pairs of Gannets raised 4 young at Bempton: a record season. White-headed Cormorants were thought to be of the northern race: one showed a blue gloss. Shags are noted as increasing, and breeding was proved at Flamborough. Several Bitterns, including one heard in summer. Spoonbills on 9th and 10th May. Gadwall and Wigeon proved to breed: the latter appears to be establishing itself slowly. Unusual numbers of Scaup both on the coast and inland (*antea,* vol. xlvii, p. 248). Many inland records of Common Scoters, including *ca.* 160 flying up the Calder valley on 10th August; these may indicate an overland migration. Grey Lag Geese in April. Up to 6 Bewick's Swans. Buzzards bred in the north-west, and Montagu's Harriers present in two areas in summer. Marsh Harriers and Hobby in autumn; a reported Osprey on 7th May should have been square-bracketed. There are interesting reports of feral Goshawk and Gyr Falcon. Information is given on the breeding-success of Peregrine and Merlin: of 20 young Merlins 6 were taken for falconry. Quail reported in two areas only. A Crane found dead on 7th April (*antea,* vol. xlviii, p. 87). Spotted Crake "heard and seen on a number of dates". 4-7 pairs of Little Ringed Plovers nested. Two Dotterel on 28th May. Great Snipe on 7th February. Unusual numbers of Wood and Curlew Sandpipers in autumn, and 4 Temminck's Stints in August. A Buff-breasted Sandpiper and a Stilt Sandpiper, both at Kilnsea in early September, have already been noted in *British Birds* (vol. xlviii, pp. 328-329, 18-20). Grey Phalaropes in March and October; a Red-necked Phalarope at Spurn on 29th-30th September is described merely as having a thin tapering bill. A number of Great Skuas in autumn; a flock of 17 Pomarine Skuas is well described, and a Long-tailed Skua is recorded on 11th September. Iceland Gull in September, and several Little Gulls. Unusual numbers of Black Terns in spring (*antea,* vol. xlviii, p. 168). Roseate Tern on 29th August. Short-eared Owls now recorded much more frequently than a few years ago. 2 Hoopoes in September. Woodlarks bred. Shorelarks in November. A Golden Oriole on 16th May. A few Stonechats in summer. Bluethroats in April, October and November. 3 or 4 Icterine Warblers and 5 Barred Warblers at Spurn between 22nd and 27th August; a Red-breasted Flycatcher there on 8th October. Chiffchaff and Blackcap in February, and Willow Warbler in December. A bird resembling a Blue-headed Wagtail on 19th May. A number of Waxwings January/March and one in December. About a dozen Great Grey Shrikes, including 3 June records. An unusual number of Red-backed Shrikes, with 3 in May-June and a number from August until as late as 21st November. Rose-coloured Starling on 1st October. A few parties of Crossbills in the first half of the year. A probable Cirl Bunting nest: 2 seen on 19th September seem to have been identified only on the absence of a chestnut rump. An Ortolan at Spurn on 3rd October. Lapland Buntings in January, February, November and December.

In addition there are notes on two inland trapping schemes, and reports (by G. H. Ainsworth and R. Chislett) on the work at Spurn Bird Observatory, including tables of birds ringed, a number of interesting "retraps" (1953), and a survey of the most interesting migration periods in 1954. It is sobering to find a statement of policy which informs visitors that ringing is the most important activity at the Observatory, and which appears to regard the systematic observation of migration as indulgence in "personal enjoyment of bird-engendered exhilaration".

It should be added that the report is not well printed, and that bold type for species names, or better spacing, would make it much easier to read. I.C.T.N.

CORNWALL BIRD-WATCHING AND PRESERVATION SOCIETY, Twenty-third Annual Report, 1953 (72 pages), and Twenty-fourth Annual Report, 1954 (58 pages). Editors: B. H. Ryves, H. M. Quick and A. G. Parsons. Records to the Secretary: Rev. J. E. Beckerlegge, St. Crowan Vicarage, Praze, Camborne. Price 4s., plus 4d. postage.

TWENTY-ONE pages and eighteen pages respectively are devoted to systematic notes on birds in Cornwall, following the *Handbook* arrangement and nomenclature. There are also complementary sections on "The Isles of Scilly" and "The Camel estuary, the Walmsley sanctuary and its vicinity", and two lists in each report of extreme migration dates, while the 1953 report has a further section on "The Cornish Seas". Although there are some obvious advantages in separating the Scilly and the Cornish Seas sections, the result is very confusing and difficult to follow: many species appear three or four times, and there is no system of cross-referencing (the five-page indices, being by sections, not by pages, do not help much), while the Camel estuary notes are not even in systematic order. Many interesting records reward the diligent reader, but there is little evidence of any systematic study of migration or distribution and no mention of co-operative work, and of 607 members of the society in 1954 only 55 contributed notes.

The publication of observers' notes *verbatim* makes the editing appear uncritical, which is all the more unfortunate as there is much evidence of careful judgment and arrangement of the records, while the few editorial comments are informed and useful. With one or two exceptions the more unusual records are presented in a convincing way, and full descriptions are given of a number of the rarest birds. Some of the other records (e.g. American Bittern in 1953, and Nightingale and Red-breasted Flycatcher in 1954), published without comment, would have appeared more satisfactory even with the mere statement that notes had been sent supporting the identifications.

The 1953 lists include the following:— Black-throated Divers in January and December. A dead Leach's Petrel in April. During a gale on 3rd September 5 Manx Shearwaters were discovered hidden in a dense hedge at Widemouth Bay! Balearic Shearwaters on 29th August and 3rd September; several hundred Great Shearwaters in the Wolf Rock/Seven Stones/Penzance area on 20th October. These records are supported by good notes, but a record of "a number" of Cory's Shearwaters in St. Ives Bay on 12th July is published without comment! Little Egret in May and June (*antea,* vol. xlvi, p. 252). An American Bittern found dead, apparently in September. Two Spoonbills wintered. Red-crested Pochard on 8th January, and Long-tailed Duck on 22nd November. One Bewick's Swan recorded, and Whoopers wintered at both ends of the year. A Hobby in April is described as unusual and one Rough-legged Buzzard is recorded. Spotted Crake on 1st October. Several Quails (*cf. antea,* pp. 161-166). Wintering waders include 40 Black-tailed Godwits, 14 Avocets and up to 3 Greenshanks; 100 Black-tailed Godwits in October. 8 records of Grey Phalaropes (up to 3 together) in September/October. Two autumn Little Gulls, and a Sabine's Gull during 23rd September-3rd October. Several Roseate Terns in autumn on the mainland: 4-6 pairs bred on the Scillies. Scops Owl on 14th October. 7 or 8 Hoopoes. On the mainland there were a number of Firecrest records January-April (*antea,* vol. xlvii, pp. 324-335), 2 Blue-headed Wagtails, and a number of records of Crossbills (largest flock 20) (*cf. antea,* pp. 289-297); a Whitethroat is recorded in January and February 1952. The most interesting Passerine vagrants, however, were on the Scillies, including an Icterine Warbler on 25th September (the published description of this bird is quite inadequate), a Yellow-browed Warbler on 22nd November, a wintering Firecrest, and a Woodchat Shrike on 8th May. 3 Bee-eaters were seen there in April.

In 1954 we note:— 4 Black-throated Divers on 7th May. Red-necked Grebe in February. Several Bitterns and two Spoonbills in January and February. One Ferruginous Duck, one Long-tailed Duck, several Eiders and up to 15 Smew, all January/April. 2 or 3 Canada Geese in February and April are described as unusual; two records of Grey Lag Geese are given, and there are other records of geese, including a party of Greenland Whitefronts in 1946. A few Bewick's and Whooper Swans early in the year. A Greenland Falcon on 16th April. An albino Turnstone was seen on the Scillies in May 1953 and in May and August 1954. Lesser Yellowlegs are reported on the Camel estuary, 6th-12th September, and on the Tamar, 24th-27th September, but the dates given on different pages do not agree and are not comprehensive (see *antea,* vol. xlviii, p. 364). Curlew Sandpipers were numerous in autumn (one flock of 20) and there are single records of Grey and Red-necked Phalaropes (the description given of the latter, in the Scillies in September-October, is neither complete nor convincing). Up to 16 Avocets in the Tamar, January/March, and up to 19 at the end of the year; other winter records include Common Sandpiper, Greenshank, Spotted Redshank, Whimbrel and 135 Black-tailed Godwits (*cf. antea,* pp. 167-171). Two Little Gulls (July and August). Two pairs of Roseate Terns bred on the Scillies, and there are 8 records on the mainland, including one on 11th November. Great Skua on 1st April (and other autumn records). Unusual numbers of Hoopoes in April and October (about 15 records). 3 inland Raven nests are recorded, and a trio of Choughs attempted to nest. Nightingale on 2nd September. Blackcaps probably increasing in west Cornwall. One Firecrest in December. Blue-headed Wagtail on 25th April. The Scilly list includes a Short-toed Lark, 26th-28th October; 2 Golden Orioles on 9th June; a Red-breasted Flycatcher on 7th October; and a Woodchat Shrike, 28th September-10th October.

Among other matters in the 1953 report there are special articles by R. H. Blair and A. G. Parsons on the breeding of a pair of Blue-headed Wagtails, including a discussion of the status of this race in Cornwall and a note (by F. A. Turk) on the nest-parasites; by H. B. Sargent on observations at a Sand Martin colony; and by C. J. Stevens on interspecific nesting associatons. Mrs. F. E. Carter contributes to the 1954 report a brief description of the Tamar lake. I.C.T.N.

SUFFOLK BIRD REPORT for 1953 (Editor: P. R. Westall) and 1954 (Editor: F. K. Cobb, Old Hall Farm, Shotley, Ipswich). From TRANS. SUFFOLK NATURALISTS' SOCIETY, Vol. VIII, Part IV, and Vol. IX, Part II. Price 3s. each.

LOWESTOFT FIELD CLUB, Eighth and Ninth Annual Reports (1953 and 1954 respectively). Recorder for birds: H. E. Jenner, 121, Worthing Road, Lowestoft. Obtainable from E. W. C. Jenner, 119, Worthing Road, Lowestoft.

THE *Suffolk Bird Report* has now adopted the Wetmore order and numbers the species according to the *B.O.U. Check-List.* All species recorded during the year are at least mentioned by name. To avoid duplication with other Reports records given for Breydon Water are from the Suffolk shore only. Use is made of records contained in Reports published by other organizations and as a result this publication now contains comprehensive information for the whole of the county.

The Report for 1953 contains 25 pages of species notes from

47 observers and from *Bird Protection, 1953* (published by the Royal Society for the Protection of Birds) and the 1953 *Lowestoft Field Club Report.* Among items of interest are:— 2 or 3 Black-throated Divers, January to March, and 2 in November; a Great Northern Diver in February; a Red-necked Grebe found dead in April. A Little Egret on 19th May. Bitterns breeding in 3 areas and almost certainly in 2 others. Up to 5 Spoonbills together in various localities between May and July. One or 2 Scaup apparently summering at Minsmere; a Ferruginous Duck on 9th February (this record is taken from the *Lowestoft Field Club Report* where it appears without authenticating details); Long-tailed Duck (4 or 5 in all) at both ends of the year; a flock of up to 12 Eider till 23rd May. A Bean Goose, "probably sick", on 20th January. 2 Rough-legged Buzzards in April; 2 pairs of Marsh Harriers breeding, one of them successfully; successful breeding of a pair of Montagu's Harriers; 2 Ospreys in May and 2 in September. A pair of Quail breeding successfully; a Spotted Crake heard at Minsmere in April and 2 there in May. A pair of Little Ringed Plovers successfully breeding and 2 seen in another locality in April and May. A Kentish Plover on 12th April; a Dotterel on 16th August; up to 500 Black-tailed Godwits; several spring Wood Sandpipers; up to 16 Spotted Redshanks; up to 25 Little Stints; a Temminck's Stint on 5th June. A Pectoral Sandpiper on 20th October which should have been described. A Curlew Sandpiper on 19th January—the first winter record for the county. 45-46 pairs of Avocets nesting but only 60-70 young raised. A Red-necked Phalarope at Havergate on various dates between 3rd June and 16th August. At least 6 Glaucous Gulls at Lowestoft in the early part of the year and several others elsewhere. A Puffin picked up alive at Bury St. Edmunds on 24th November. One (perhaps 2) Hoopoes on 2nd May; Wrynecks breeding in 3 localities and possibly in others. Two (perhaps 3) male Golden Orioles in May (descriptions should have been given here). Bearded Tits breeding in 3 localities but in much reduced numbers owing to flooding. A Fieldfare on the early date of 9th August; 13 Redwings on 3rd August; Redstarts on 22nd and 25th March; only one breeding pair of Black Redstarts definitely established at Lowestoft. A Firecrest on 21st October. 2 Waxwings in January and 7 in December. A Great Grey Shrike as late as 24th May. 2 Arctic Redpolls at Lowestoft on 19th October and one there on the 21st; these birds are described in detail and are the first for the county. Details are given of the midsummer Crossbill invasion (*antea*, pp. 289-297). Up to 11 Lapland Buntings in October-November (*antea*, pp. 6-25).

The Report is obviously carefully compiled and we are pleased to see (under "Harrier ? species") that the Editor is not prepared lightly to accept early autumn "ring-tails" as Hen Harriers; this sets an example which might well be followed by the Editors of some other Reports. The only record which, on the published evidence, appears not quite certain is one of an Iceland Gull at Lowestoft on 19th January. This issue also contains Ringing Recoveries, Records of Visible Migration (made by the Lowestoft Field Club) and some account of the results of the floods.

The 1954 Report contains 19 pages of records from 47 observers and from the Reports of the Cambridge Bird Club, the Dingle Bird Club, the Essex Bird-Watching and Preservation Society, the Lowestoft Field Club and the Royal Society for the Protection of Birds. We note:— 3 Black-throated Divers (for February, March and November). 2 Red-necked Grebes. A Leach's Petrel found exhausted at Lowestoft on 11th December. 6 Shags, 2 of them from inland localities. Up to 10 Spoonbills during the summer months. A Long-tailed Duck in January and February. Up to 300 Brent Geese. A Rough-legged Buzzard in January and one in April; a pair of Marsh Harriers breeding successfully; no Montagu's Harriers known to have nested; an Osprey in August and one in October. A Spotted Crake in March; Corncrakes seen with young and thought to have bred. No Little Ringed Plovers recorded, though breeding had taken place in the 3 previous years; Spotted Redshanks in every month of the year and up to 16 together; a Greenshank on 14th February and 3 on 14th March; a Temminck's Stint on 10th October; a Pectoral Sandpiper on 2nd August, again without supporting details though these are stated to have been received. At least 52 pairs of Avocets nesting at Havergate and raising 60-70 young; 2 pairs nesting elsewhere robbed by humans. Up to 3 Red-necked Phalaropes at Havergate between 6th August and 18th September. Up to 6 Glaucous Gulls again at Lowestoft; a Mediterranean Black-headed Gull at Havergate on 8th and 11th July, the first definite record for the county. An increase in the Sandwich Tern colony at Havergate to *ca.* 150 pairs, though only 30-40 young raised. A Hoopoe in May and one in September. 2 pairs of Wrynecks probably breeding. Bearded Tits apparently recovering from the floods of the previous year, but numbers still low. Only 2 records of breeding Stonechats. Black Redstarts seen and heard in Lowestoft in April and May, but no evidence of breeding. A Blackcap in February had "apparently been present since 29th January", the first record of wintering for the county. 2 pairs of Grey Wagtails nesting in East Suffolk for which area there are no previous breeding records; 2 "variant" Yellow Wagtails in May and June. 9 Waxwings in January and February and one in December. No increases noted in breeding Crossbills following the influx of the previous year. 2 Little Buntings at Walberswick on 11th October.

A Raven at Walberswick on 14th September appears to have been correctly identified but the Editor prudently encloses it in square brackets on the grounds that there have been no Suffolk records since 1884 and that it was seen only by one observer. Commendable editorial caution is shown by the rejection of several Golden Oriole records. "This species", it is stated, "seems to be claimed with a care-free abandon—and an entire lack of supporting evidence!" At least one other County Report has had very similar experience with regard to records of this species.

This issue of the Report also contains an account of Bird Ringing at Walberswick, migration notes and some notes on breeding Mistle Thrushes.

The *Lowestoft Field Club Report* continues to use, curiously enough, the order followed by Claud B. Ticehurst in *The Birds of Suffolk* which, since this excellent work was published in 1932, predates even that of *The Handbook.* Even the English names which were used by Dr. Ticehurst, but which are not in general use to-day, are retained, e.g. Bearded Reedling for Bearded Tit. We note with pleasure, however, that in the 1954 Report the "c" is dropped from Sclavonian Grebe. Scientific names are not given. It is not clear what definite area, if any, is covered since records are given from localities as remote from Lowestoft as Havergate. Both issues of this Report contain, besides some dozen pages of species notes, information on migration, a Tidemark Report and Recoveries of Ringed Birds.

As has been stated above, the *Suffolk Bird Report* has drawn upon the records contained in these Reports so that there is no need to go through them again here. Occasionally, however, an important record appears in the *Lowestoft Report* but not in the Suffolk one, e.g. 7 Barnacle Geese over Corton on 16th February 1953 and 39 Whooper Swans on Breydon on 8th January of the same year. It would be of interest to know if such records are not accepted by the Suffolk Editor or if their omission is due to some other reason. D.D.H.

THE BEDFORDSHIRE NATURALIST, No. 8 for 1953 (50 pages; 2 bird plates), and No. 9 for 1954 (46 pages; 1 bird plate). Published by the Bedfordshire Natural History Society and Field Club. Bird recorder: H. A. S. Key, 61b Goldington Road, Bedford. Price 5s. each.

APART from a few short notes, the bird records are given in nine-page and ten-page systematic sections, following the Wetmore order and using the *Handbook* vernacular names. The lists are well arranged and summarized, with short but informative introductory notes, which include lists of species observed but not included in the systematic sections (a valuable addition which occupies only 7 lines in each issue and could be followed with profit by other Local Reports). Despite the small number of contributors, the list is comprehensive, and there are thorough reports on many of the commoner species, especially the Passerines (on which many inland county reports are weak). The editor wisely draws attention to the patchy distribution of observers and to unworked areas.

A strict policy is mentioned concerning records of unusual birds, although there are a few cases (notably a square-bracketed Nightjar on 9th December 1953, and a Golden Eagle and a Purple

Sandpiper in 1954) which suggest that it could be somewhat stricter. Further, in 1954 notes on the identification of unusual birds are almost entirely omitted. This policy seems to the reviewer to be most unwise, for the publication of one or two records with only a few unconvincing words as supporting evidence then serves only to cast doubt on the critical standards applied, so that other records appear less satisfactory.

The 1953 systematic list includes the following:— 4 Manx Shearwaters in September/October. A Bittern in September: the statement that Bitterns have now occurred annually at this locality in summer for six years in fact appears to refer to August and September. Garganey bred. 2 Barnacle Geese in January were probably "escapes"; Pink-footed Geese were also identified, among other records. Several Buzzards: a Buzzard and a Hen Harrier were killed in the same trap in December. One Quail in summer. Many wader records include Oystercatcher, Wood Sandpiper, Little Stint and Curlew Sandpiper; a remarkable record of 30 Whimbrel on 11th December is given with no mention of supporting details. Stone Curlews present in summer. Kittiwake in April. Puffin in February. Hoopoe on 25th April. Blackcap in February. Pied Flycatchers "may have bred" in Bedford gardens, but the evidence is extremely weak. Great Grey Shrikes in January and October; no breeding-records of Red-backed Shrikes. Twite on 2nd September. A large flock of Crossbills in July, among other records. A special survey for Cirl Buntings proved negative.

In 1954 the more unusual occurrences included:— Black-throated Diver, Slavonian and Black-necked Grebes in late January/early February. A flock of 15 Shags on 3rd February coincides with many other inland records (*see antea*, vol. xlviii, pp. 470-471); others were seen at this time in Bedfordshire and 6 on 4th-5th December. Bitterns in both winters. Unusual variety of ducks present in the January/February cold spell, including Pintail, Scaup, Red-breasted Merganser and up to 12 Smew. Common Scoter in December. Pink-footed Geese again identified. An Eagle, thought to have been a Golden Eagle and published in square-brackets, is recorded from Woburn in March: the evidence given is thoroughly unsatisfactory. Water Rails thought to breed; 2 Corncrakes in summer. Oystercatcher, Little Ringed Plover, Wood Sandpiper, Curlew Sandpiper and Ruff seen on passage, and Knot and Ruff in winter. An undated record of a Purple Sandpiper, seen by a schoolboy, is claimed as the first for the county, but the details given are quite inadequate and the editorial comment suggests that this was not thought to be very remarkable. A number of Black Terns in May (*antea*, vol. xlviii, p. 166). Puffin in December. A special note by A. D. Pentland describes the unsuccessful breeding of a pair of Grey Wagtails. 2 Waxwings in February. Great Grey Shrike in March. 4-5 pairs of Red-backed Shrikes nested in the Luton area. One or more Twites reported in late August. I.C.T.N.

TRANSACTIONS OF THE HERTFORDSHIRE NATURAL HISTORY SOCIETY AND FIELD CLUB, Vol. XXIV, Parts 1, 2 and 4. Reports on birds observed in Hertfordshire in 1950 and 1951 (13 pages: edited by J. N. Hobbs); in 1952 (10 pages: edited by J. S. Carter, 26 St. John's Road, Golders Green, London, N.W.11); in 1953 (10 pages: edited by J. S. Carter). Price for each isue of the *Transactions* 7s. 6d.

THE first of these Reports was unfortunately not published until 1953, and we regret that further delay in producing this notice has entirely removed any topicality from the observations included in it. Dr. Carter took over the editorship at short notice in 1953, and the Report now seems to have achieved a welcome stability both in editing and arrangement. It is greatly to be hoped that at the same time its publications date will become more regular and that the number and distribution of its contributors will increase, so that it can attain the full status of the report on the birds of the county and consist less of a series of disjointed notes, mostly centred on the Tring reservoirs. Dr. Carter's skill and judgement seem to be more than adequate for such a task. However, if this is achieved it is most important that a more satisfactory system be adopted to deal with the records from that part of Hertfordshire which is also covered by the *London Bird Report*. No criticism is made here of this overlap, which is acknowledged by the Hertfordshire Report (but not by the *London Bird Report*), but at present there is no exchange system, and many records are published in one Report and not in the other. The result is that to study the avifauna of one of the best-watched areas in the county it is necessary to compare two lists which are both highly selective, a thoroughly unsatisfactory situation.

The more noteworthy records in these Reports are as follows:

1950 :— Five Brent Geese were seen in December; a White-fronted Goose and a Barnacle Goose were thought to have escaped from captivity, and 9 Pink-footed Geese are recorded (but square-bracketed in the *London Bird Report*). One Corncrake nest is mentioned. Black Terns in spring and a late Temminck's Stint have already been recorded in *British Birds* (vol. xliv, pp. 172, 316-317), but this Report extends the dates for the latter until 3rd November. Among other records of waders a Spotted Redshank on 29th November is the most noteworthy. Hoopoe at Tring on 30th April. Woodlarks bred on both sides of the Hertfordshire/Buckinghamshire boundary, and there are 4 records of Cirl Buntings. A Water Pipit at Tring on 16th October is the first for the county, and one or two Rock Pipits were seen at the same period. Grey Wagtails were recorded as spreading in the Gade, Colne and Bulbourne valleys. Great Grey Shrikes in March and December.

1951 :— A Bittern in January. Six Bewick's Swans at Tring in February, which probably flighted to the flooded Thames by day to feed. 7 Common Scoters and 2 Spotted Redshanks in May.

A Quail in summer. One pair of Wrynecks nested. A Golden Oriole in May and a Firecrest from January to March.

1952 :— One or two Black-necked Grebes were seen at Tring in August and September. A Leach's Petrel at Royston during the autumn "wreck" (*antea,* vol. xlvii, p. 152). A number of Garganey in early autumn. A report of 5 or 6 Peregrines on the Cambridgeshire boundary on 24th July is unusual enough to warrant supporting details, and the note is not included in the *Cambridgeshire Bird Club Report.* An Osprey on 11th May. 2 Quail records. 2 Little Ringed Plovers in May, Spotted Redshank and Little Gull in October, and Kittiwake in July, all at Tring. A Hoopoe on 4th May. Woodlarks again seen in summer in the extreme south and west. As in 1951, Willow Tits were reported to be commoner than Marsh Tits in one area on the chalk. Rock Pipit and Snow Bunting in October. 6 pairs of Red-backed Shrikes mentioned.

1953 :— Slavonian Grebe in November and two spring Black-necked Grebes. A Blue-winged Teal is recorded for January 1938 but is square-bracketed (*cf. Bull. B.O.U.,* vol. 73, p. 40). A Scaup in January. 2 Ferruginous Ducks are reported in late April and early May: they are square-bracketed as possibly escapes, although "there is no doubt as to their identity"; they are, however, omitted entirely from the *London Bird Report.* 8 White-fronted Geese in December and 11 Pinkfeet in January. Quail reported from "a number of points". A Little Crake present January-March (*antea,* vol. xlvi, pp. 452-454). One pair of Little Ringed Plovers nested (*antea,* vol. xlvii, p. 200). A pair of Common Sandpiper summered and one wintered. A Lesser Yellowlegs at Tring in September is the first for the county (*antea,* vol. xlviii, p. 364); 18 Little Stints were present at the same time (*antea,* vol. xlix, pp. 121-134) and a Grey Phalarope remained for 8 days in November. Stone Curlews are increasing in the north of the county, as in Cambridgeshire. The continuing spread of gulls into the county is noted. Sandwich Tern on 4th June. One or two Hoopoes in June and there is one unconfirmed report of Wrynecks nesting. A Blue-headed Wagtail in April. Two autumn Great Grey Shrikes. 2 Twites in November and a Snow Bunting in October. Three records of Crossbills, one of a flock of 30 (*cf. antea,* pp. 289-297). An Ortolan on 8th February is the first for the county (*antea,* vol. xlvii, p. 447).

Also in these issues of the *Transactions* are a list by S. E. Linsell of birds observed in Hertfordshire within six miles of Bishop's Stortford; a 16-page list by B. L. Sage of birds of Elstree reservoir, relating some of the changes in status to recent changes in ecology and disturbance; and a full discussion by the same author of the history and status of the Goldfinch as a breeding bird in the county. I.C.T.N.

HUNTINGDONSHIRE FAUNA AND FLORA SOCIETY, 6th Annual Report, 1953 (22 pages), and 7th Annual Report, 1954

(24 pages). Bird editor: C. F. Tebbutt, The Ferns, Eynesbury, St. Neots. Price 10s. 6d. each.

THE slender three-page classified list in each of these Reports cannot do justice to the bird life of this well-placed county. The paucity of past observation in Huntingdonshire is reflected in the fact that a Merlin in 1954 was the first since 1924, Ruffs and Nightjars in 1954 and a Hawfinch in 1953 the first for many years, and two White Wagtails in 1954 the first for the county—but even in 1954 there were only 13 contributors. Some breeding-censuses and wildfowl counts are mentioned (the results of the latter, incidentally, are given from one locality only), but on the whole the records are very scanty. There is no mention of the adoption of any critical standards in dealing with unusual records, although some of the observations included (e.g. Buzzard, Little and Sandwich Terns) deserved some comment.

In 1953 a pair of Garganey was proved to breed for the first time in the county, and Tufted Ducks and Pochards also bred. Up to 55 Bewick's Swans were seen throughout February (other information given on this species is not correct). 3 Corncrakes calling in summer "seem to have nested". Little Ringed Plovers displaying in May but no evidence of nesting. Herring Gulls appeared regularly in winter for the first time. A pair of Common Terns for two weeks in June; 1-2 Little Terns reported nearby at the same period. Two Puffins on the Ouse on 28th November. A Stonechat in May.

The 1954 notes include:— A Bittern in late June. Nesting suspected of Wigeon and proved for Tufted Duck and Pochard; 180 Pintail were seen in February (*cf. antea,* vol. xlvii, pp. 395-397). Unusual numbers of grey geese were present in both winters and up to 21 Bewick's Swans were again seen. The list of waders includes Oystercatchers, Little Ringed Plovers, up to 12 Wood Sandpipers, a Little Stint and several Ruffs. Common Terns bred for the first time (*antea,* vol. xlviii, p. 89). A Sandwich Tern on 3rd June is the first for the county. A Marsh Warbler nest was found in July: the evidence described is convincing but the occurrence merited fuller details. 5 Snow Buntings in February.

Separate lists of first and last dates of migrants, and reports on observations at Butler's Pit, Fletton, are given in both Reports; there is also a survey of breeding-birds at Woodwalton Fen in the 1953 report; and a table of wader counts at Orton beet factory, and a list of the numbers of breeding-birds in Holme Fen in the 1954 one. These sections contain some of the most interesting records in the two reports, including many ducks at Fletton, an interesting list of waders at Orton, and Water Rails, Willow Tits and (in winter) Bitterns at Woodwalton, but there is no cross-referencing. I.C.T.N.

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BRITISH BIRDS

AUTUMN MIGRATION ON THE KINTYRE PENINSULA

By Ivan M. Goodbody

INTRODUCTION

The Kintyre peninsula forms a tongue of land in western Argyll, Scotland, seldom more than ten miles across and extending for some fifty miles southward from Lochgilphead and the Crinan canal. Fig. 1 shows that its geographical relations are particularly interesting from the standpoint of migration. To the north the peninsula is in contact with the Scottish highlands and forms a " funnel " into which birds coasting along western Scotland might pass together with birds from the highland country itself. To the south-west is the coast of Co. Antrim, Ireland, only 15 miles distant and clearly visible under normal conditions, while to the south-east beyond Ailsa Craig (*ca.* 18 miles) is the Galloway coast (*ca.* 25 miles), visible only in fine weather. This position suggested that the peninsula might have special significance in connection with the Irish Ornithologists' Club study of Skylark migration in Ireland (Goodbody, 1950; 1952; 1953).

A preliminary reconnaissance was carried out on 11th and 12th October 1952: this was followed up in 1953 by a visit of a week from 12th to 18th October and in 1954 by a longer stay from 23rd September to 8th October. The primary purpose of these visits was to collect data on the movements of Skylarks, but observations were also made on a number of other species. In this paper the four most important movements observed, those of Skylark, Meadow Pipit, Fieldfare and Redwing, and Chaffinch are separately described. It will be shown that the peninsula is an important jumping off ground not only for birds travelling towards Ireland, but also, under certain conditions, for birds going towards Galloway.

TOPOGRAPHY AND OBSERVATION AREA

Most of the observations were made along the south coast from Macharioch in the east to Mull of Kintyre lighthouse in the

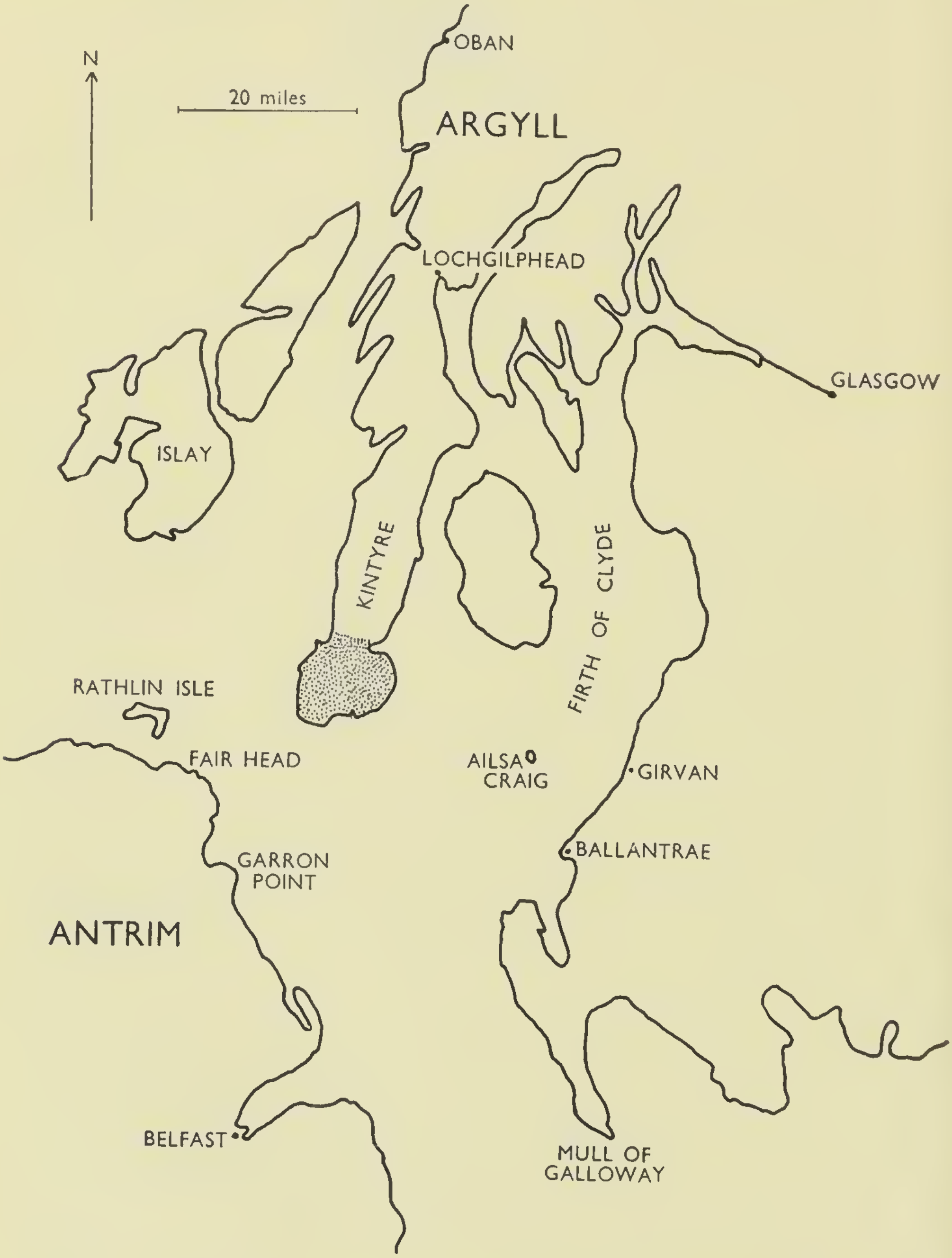

FIG. 1—SKETCH MAP OF SOUTH-WEST SCOTLAND AND NORTH-EAST IRELAND, SHOWING GEOGRAPHICAL POSITION OF THE KINTYRE PENINSULA

Stippling indicates the area of observation shown in Fig. 2.

west, but more general observations were also made as far north as Campbeltown and Machrihanish (Fig. 2). Much of this area is hilly and lies between 500 and 1200 feet above sea-level, but three main low-lying areas may be distinguished: to the north-east of Machrihanish is an extensive area known as Aros Moss bounded by sand dunes on its westward side; between Southend and Macharioch the ground is comparatively low-lying particularly at the two places in question; and there is a small area of about 600 acres at Carskiey Bay. To the west of Carskiey as far as the lighthouse and north-west as far as Machrihanish is a moorland area intersected by narrow valleys, where much of the ground rises above 1000 feet; this region which is here called Mull, is

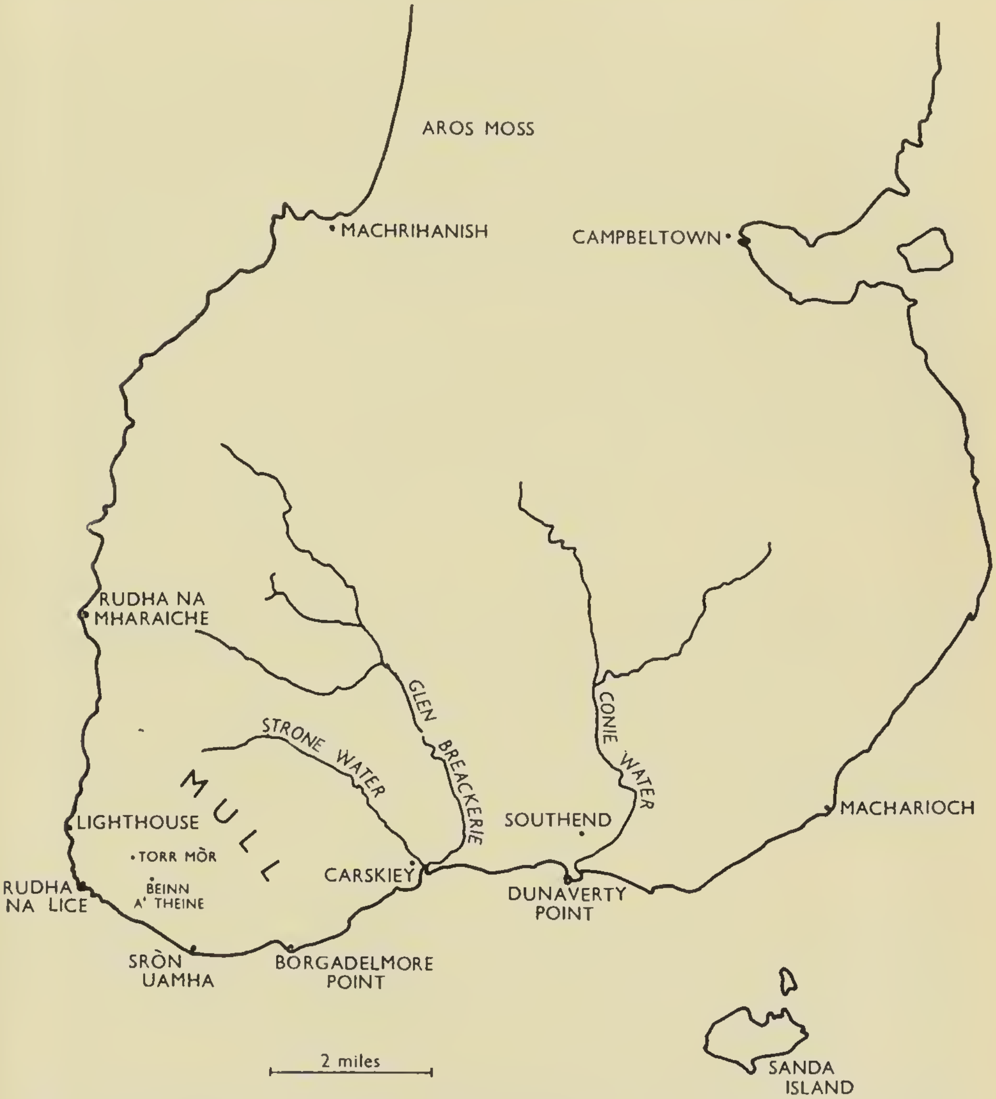

FIG. 2—SKETCH MAP OF THE SOUTHERN TIP OF THE KINTYRE PENINSULA
This area is shown stippled in Fig. 1.

important to the study of migration but, due to the nature of the terrain, is difficult to cover adequately. The difficulties are accentuated by the steeply sloping cliffs along which birds may coast at varying heights; at Rudha na Lice birds may coast around the hilltop 1000 feet above an observer at sea-level. In such circumstances it is not possible to keep an adequate record of all birds moving and our observations from this area leave much to be desired.

MOVEMENTS OF SKYLARKS (*Alauda arvensis*)

1952.

Observations were made on 11th and 12th October only; Skylarks were the principal migrants seen, accompanied by a few Meadow Pipits. In the early morning of the 11th, with a light east-south-east wind and no cloud, large numbers of larks were rising from Aros Moss and flying around in flocks of up to 100 birds each. On the north side of the Moss some headed away to the east, but to the south of the Moss where most were seen the birds headed to south-east into hilly country. Aros Moss is a tract of low-lying country flanked by hills and it would appear that these flocks used it as a temporary resting-ground, possibly having accumulated there in poorer weather conditions.

This movement was traced to Southend where birds were deflected north-east along the coast toward Macharioch; at the latter point they were heading away to sea in an easterly to south-easterly direction.* Detailed quantitative data were not collected but between 09.00 and 09.30 hrs. birds were leaving the point at the rate of 400 per hour and it is fairly certain that the movement continued for several hours. A rapid reconnaissance of other areas on the south coast was made the same day, but no other movement was seen. Severe weather on the 12th made normal migration impossible.

1953.

Between 12th and 18th October few Skylarks were seen migrating, in spite of generally fine, calm conditions. There had been heavy passage at Aberdeen between 23rd September and 9th October (*personal observation*) and a big movement occurred at Inishtrahull, north-west Ireland, on the night of 7th/8th October (Gibbs *et al.*, 1954); this suggests that we may have been too late for the big movements at Kintyre.

Observations were made at Macharioch, Southend, Carskiey and Mull. Not every point was watched each day and in general the times at which observations could be made were later than desirable

---

*Throughout this paper the directions in which birds departed to sea are those in which the bird moved and are not necessarily the directions in which birds were facing. Birds were followed with field-glasses until out of sight. Times are G.M.T.

(detailed observations seldom began before 08.30 hrs.); however, I believe that no big movement was missed. At Macharioch few birds were seen moving except on the 13th, when a small stream coasted to the north-east, and on the 14th when with a light north-north-west wind a few birds departed to sea in east and east-south-east directions (56 birds in 3 hours). Small numbers were seen in the region of Dunaverty Point, the only ones of any significance being those departing to sea.†

At Carskiey a large movement coasting to the west was observed on the 13th in a light northerly wind, with smaller numbers on other days. The coasting stream at this point was found, in 1953 and 1954, to be derived almost entirely from birds coming from Glen Breackerie or the hills to the north-east. The coasting stream from Dunaverty usually crosses Carskiey Bay and unites with the other to the west of Carskiey.

The Mull area was visited on only three mornings and few larks were observed. On 14th October 30 birds were seen, none actually departing to sea. On the 17th and 18th a few larks were moving amongst Fieldfares and Redwings: 19 birds were seen departing, all going south and south-south-west. Many more larks may have passed on these latter two days, but the scale on which thrushes were migrating not only distracted an observer's attention from watching for larks, but the incessant chatter of Fieldfares made it impossible to hear larks calling.

1954.

Observations extended from 19th September to 7th October, being confined principally to Dunaverty Point, Carskiey and Mull. With the exception of 28th September and 3rd October observations were made at Carskiey every morning, commencing at dawn or shortly afterwards. The object of watching here was to determine on which days a large movement was in progress, hence the period of observation varied, being shortest on days of heavy passage when the observer moved to a more important point. The data from Carskiey are set out in Table I, together with similar data for the Meadow Pipit. Large movements occurred on only 4 days of the 17 observed—22nd and 27th September and 4th and 6th October—while no movement occurred on 7 days. The data in this Table are too few to show the precise weather conditions under which peak movements may be expected. Wind-direction is possibly not very important except that winds from an easterly sector may divert part of the movement away from Carskiey (*vide* 1952 observations). All the large movements occurred on fine calm days and it will be noted that every other day except 24th September and 7th October had some inhibiting element such as high wind, rain or mist.

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†5 to south-west, 15th October (light east-south-east wind): 12 to south-south-west, 16th October (moderate south-south-west wind): 8 to south and 13 to south-west, 17th October (light west wind).

Dunaverty Point was watched as often as possible in an attempt to determine under what conditions birds departed to sea and in what directions. In reference to this locality it should be noted that Sanda Island lies S.30°E. and some birds after leaving the point may be attracted to this island, later re-orientating from there. Furthermore, Borgadelmore Point lies W.15°S. from Dunaverty and some birds may turn in towards it after setting off to sea—many birds do in fact head directly towards Borgadelmore. To allow for these possibilities, birds leaving Dunaverty in a direction north of W.25°S. were classified as coasting and birds leaving east of S.10°E. were classified as being liable to reach Sanda Island, hence they are treated as a group. Table II shows the data collected at Dunaverty in 4 different types of wind. More birds were observed in west and south-west winds than in north-west and west-north-west; as other factors were not equal this

TABLE I—COASTING MOVEMENTS OF MEADOW PIPITS (*Anthus pratensis*) AND SKYLARKS (*Alauda arvensis*) AT CARSKIEY, 1954

Date	No. of pipits peak hr.	No. of larks peak hr.	Observation time in mins.	Wind and weather at 06.00 hrs.
19 Sept.	67	0	70	SW : Blustery, dull.
20 Sept.	0	0	90	W : Heavy showers.
21 Sept.	0	0	60	NW : Heavy showers.
22 Sept.	573	492	60 (25)	N20W : Light wind, fine.
23 Sept.	35	4	85	S : Rising wind, rain.
24 Sept.	8	0	60	W30S : Light wind, fine
25 Sept.	0	0	60	N30W : Stormy.
26 Sept.	140	68	180 (30)	W20S : Light wind, wet and cold
27 Sept.	440	140	15	W30S : Light wind, fine.
28 Sept.	—	—	—	W10N : Cold, overcast.
29 Sept.	184	0	15	N30W : Wild and showery.
30 Sept.	76	26	180	NW : Light wind, low cloud, warm.
1 Oct.	32	94	30	W : Light wind, rain and mist.
2 Oct.	0	0	100	S20W : Light wind, very misty.
3 Oct.	—	—	—	S : Heavy rain.
4 Oct.	300	522	30	W10N : Overcast and calm.
5 Oct.	386	43	35	W : Light wind, misty.
6 Oct.	37	140+	215	W30N : Light wind, fine.
7 Oct.	54	67	150	S : Light wind, overcast, becoming very cold.

NOTES :— i) Numbers of birds are given for the peak hour of watching; the total time of watch is also given. Where the total observation time is less than one hour the figures are adjusted so as to be equivalent to a one-hour period.

ii) Time for total watch was less for lark than for pipit on two occasions; this is because larks usually start moving later than pipits and time is taken from appearance of first bird. This occurred on 22nd and 26th September and shorter time of watching is shown in brackets.

iii) A peak undoubtedly occurred on 6th October and was observed at Mull. The observer at Carskiey recorded that large numbers of birds were passing high up on the hill and could not be adequately counted.

preponderance may be of no significance. From Table II we can calculate the percentage of birds going to sea in any particular wind as follows:

Wind:	N.W.	W.N.W.	W.	S.W.
Total No. of birds:	160	125	200	564
% going to sea:	27.5	34	47	52

Here again the differences may not be significant since other weather factors were not equal (see Table I).

TABLE II—DEPARTURE TO SEA OF SKYLARKS (*Alauda arvensis*) AT DUNAVERTY POINT UNDER VARYING WIND CONDITIONS, 1954

Dates		30 Sept.		26 Sept.		28 Sept. 1 Oct. 5 Oct.		24 Sept. 27 Sept. 4 Oct.			
Wind direction		N.W.		W.N.W.		W.		S.W.		Total No. of Birds	% of Grand total
		Birds	Parties	Birds	Parties	Birds	Parties	Birds	Parties		
Direction in which birds left the Point.	Coasting	116	9	82	4	106	13	272	42	576	55
	W.30 S.			10	2	9	1	154	11	173	16.5
	S.W.	44	1	6	2	75	8	82	14	207	20
	S.S.W.					10	2	10	1	20	2
	S.			27	1			15	4	42	4
	S.10 E. and to E.							31	6	31	3
No. of mins. observation		105		180		580		625			

NOTES:— i) Birds departing from point in directions W.25 S. and north of that are considered to be coasting (see text).

ii) Although directions of departures were recorded accurately, they are here reduced to simple directions as W.S.W., S.W., etc.

iii) Not included in the Table are 6 birds (1 party) heading to S.10 W. in S.S.W. wind on 2nd October in 225 minutes of watching.

iv) Further weather data may be found in Table I.

v) Observations at Dunaverty usually started about 07.00 hrs. Discrepancies in wind-directions between here and Carskiey are due to wind changes in interval between 06.00 and time birds were seen at Dunaverty.

It will be clear that Dunaverty Point is an important departure point for Skylarks under these wind-conditions. Birds come to the point very largely from the valley of the Conie Water and then divide into a coasting movement and a group heading away to sea principally in a direction slightly west of south.

Observations at Mull centred on determining the fate of the coasting stream at Carskiey and on ascertaining the directions taken by birds going away to sea. The coasting stream has been detected at one time or another the whole way from Carskiey to Rudha na Lice where birds may turn northward and follow the coastline toward Rudha a' Mharaiche. Such a northward stream was observed on 22nd and 27th September, both peak days at Carskiey (see Table I). This northwards stream has not been followed beyond the lighthouse.

The stream does not always behave in this way and it is clear that many birds depart to sea between Carskiey and Rudha na Lice. Thus on 4th October a peak passage was recorded at Carskiey between 07.00 and 08.00 hrs. and was still in progress at 10.30, but few birds were seen at Rudha na Lice in the intervening period (because of the height of the hill face here, it is not possible to obtain quantitative data for comparison with Carskiey). More revealing is the observation of 6th of October when an observer at Borgadelmore Point saw an exceptionally large coasting movement of larks, pipits and Chaffinches: at the same time an observer watching in the Rudha na Lice area at all levels saw no larks at all, but did see pipits and Chaffinches. It is clear that many of the larks must have departed to sea in the intervening area.

As well as the coasting stream there is evidence for a small broad-front movement coming from a northerly direction across Mull; little is known about this movement and it is possibly of

TABLE III—DEPARTURE TO SEA OF SKYLARKS (*Alauda arvensis*) FROM MULL, 1954

Locality and date	Wind	No. of birds and parties leaving in different directions.				
		S.	S.S.W.	S.W.	W.S.W.	W.
Rudha na Lice 27 Sept. & 4 Oct.	S.W.	9 (3)		5 (2)		1 (1)
Sron Uamha 6 Oct.	W.30 N.			46 (4)	7 (2)	
7 Oct.	S. (backing S.E.)		2 (1)	44 (5)	45 (5)	
Borgadelmore 6 Oct.	W.30 N.	7 (1)		53 (4)		

NOTE:—Figures in brackets refer to number of parties observed; other figures are number of birds.

small importance. It has been recorded on two occasions forming a small coasting stream passing southward at the lighthouse.

The actual departure of larks to sea has been recorded at several places on Mull: they are listed in Table III. Apart from these records of birds actually seen leaving the coast, I saw on 6th October while at Borgadelmore Point a large movement of birds heading approximately westward far out over the sea; some of these birds were almost at the limits of visibility with field-glasses and could not be identified for certain, but those that could be identified by their flight were all larks. Over a hundred birds were seen in this way and others were almost certainly missed. This seems to indicate a large scale departure to sea from other points along the coast. It was not possible to be certain at a distance of the precise direction in which the birds were flying, but it was approximately west while the wind was light to moderate W.30°N.

MOVEMENTS OF MEADOW PIPITS (*Anthus pratensis*)

The movements of Meadow Pipits were essentially similar to those of the Skylark and need not be treated in detail. In 1952 a small number were seen moving in company with larks to the south-east and away to sea at Macharioch; in 1953 only a small coasting movement was seen, the maximum being 43 in 45 minutes at Southend on 17th October. As Meadow Pipits are generally

TABLE IV—DEPARTURE TO SEA OF MEADOW PIPITS (*Anthus pratensis*) AT DUNAVERTY POINT UNDER VARYING WIND CONDITIONS.

Dates		26 Sept.		1 Oct. 5 Oct.		27 Sept. 4 Oct.		2 Oct.		Total No. of birds	% age of Grand Total
Wind direction		W.N.W.		W.		S.W.		S.S.W.			
		Birds	Parties	Birds	Parties	Birds	Parties	Birds	Parties		
Direction in which birds left the point.	Coasting	45	7	38	14	252	50	9	2	344	79
	W.30 S.					55	7			55	13
	S.W.					27	7			27	6
	S.S.W.			4	1	4	1			8	2
No. of mins. observation		180		470		585		225			

NOTES :— i) Birds departing from point in directions W.25 S. and north of that are considered to be coasting (see text).

ii) No pipits were seen in 105 minutes watching in N.W. wind on 30th September.

earlier migrants than larks it is not surprising that few should have been seen at this late date. A single pipit was seen departing to sea from Rudha na Lice in a south-west direction toward Antrim on 14th October.

The situation in 1954 was different and Meadow Pipits formed a large proportion of the migrants observed. At Carskiey the peak days for pipits coincided with those for larks except on 5th October when a lot of pipits were observed and few larks (Table I); this preponderance of pipits continued all morning and was seen by observers following the coasting stream from Carskiey to Borgadelmore. On other days pipits were more abundant than larks. At Dunaverty Point fewer pipits than larks were seen and in general they showed less tendency to go to sea (Table IV). Of the total of 404 pipits recorded at this point 79% were coasting; except in one case only, birds went to sea in a south-west wind. Compare this with the Skylark (Table II), where only 55% of the birds were coasting.

At Mull the movement was again similar to that of the Skylark except for a greater tendency to hug the coast and not depart to sea. Thus on 6th October when 52% of all birds seen passing Borgadelmore Point were larks and 33% pipits, only pipits were seen coasting past Rudha na Lice. As with the larks the fate of the coasting stream is unknown after it has turned north past the lighthouse. In spite of their greater tendency to hug the coast a number of pipits have been seen departing to sea in a manner similar to Skylarks; they are listed in Table V.

TABLE V.—DEPARTURE TO SEA OF MEADOW PIPITS (*Anthus pratensis*) FROM MULL, 1954

Locality and date	Wind	No. of birds and parties leaving in different directions.							
		S.S.E.	S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.
Rudha na Lice 27 Sept. and 4 Oct.	S.W.	4 (1)	2 (1)	5 (2)	17 (4)		8 (4)	2 (1)	14 (2)
Sron Uamha 7 Oct.	S. (backing S.E.)				5 (2)	26 (5)	26 (6)		
Borgadelmore 6 Oct.	W.30 N.			1 (1)	18 (5)				

NOTE :—Figures in brackets refer to numbers of parties observed ; other figures are numbers of birds

The behaviour of Meadow Pipits on the peninsula then is essentially similar to that of Skylarks with the proviso that they tend to hug the coast more than the latter species; this is probably linked with their weaker flight and hence their greater "fear" of the sea crossing.

MOVEMENTS OF THRUSHES (*Turdus* spp.)

A spectacular rush of Fieldfares (*Turdus pilaris*) and Redwings

(*T. musicus*) passed through the peninsula on 16th, 17th and 18th October 1953. On the 16th large flocks were found feeding on Hawthorn (*Crataegus*) bushes near Macharioch and several flocks were seen travelling to the west over Southend. On the 17th they were coasting westward at Carskiey in a light west wind after coming down to the sea from Glen Breackerie; a rough count showed that about 2,500 birds passed between 08.30 and 09.00 hrs. The movement was followed out on to Mull where birds hugged the contours closely but did not necessarily follow the coastline. Observers subsequently watched from the top of Tòrr Mòr and Beinn a' Theine and saw large numbers departing to sea. The main mass of the movement seemed to be converging on this south-west corner of the peninsula where at least 2,500 birds were seen going to sea (Table VI). The directions taken were between west and south-south-west, all of which would take them to Ireland. On the same day an observer at Southend saw only one flock of 150 Fieldfares, travelling west in the same period.

TABLE VI—DEPARTURE TO SEA OF THRUSHES (FIELDFARE AND REDWING *Turdus pilaris* AND *musicus*), OCTOBER 1953.

Locality		*Torr Mor*	*Borgadelmore*
Date		17 *Oct.*	18 *Oct.*
Wind direction		*W.*	*E.*
Direction in which birds departed		*Approx. No. of birds*	*Approx. No. of birds*
	W.	600	
	W.S.W.	1,350	
	S.W.	100	25
	S.S.W.	500	250
	S.		1,200
	S.E.		65

NOTE :—These figures are minimal; it was not always possible to record every party passing and some could be heard and not seen.

On 18th October this movement was still in progress and observations were made at Mull from 09.30 to 11.00. In spite of a light east wind birds were still pouring out to sea in a south to south-west direction (Table VI). This departure was observed at Borgadelmore Point so that the directions cannot be compared with those of the previous day; Tòrr Mòr and Beinn a' Theine were enveloped in cloud. Most were Fieldfares with a small sprinkling of Redwings amongst them; because many of the flocks were mixed it was not possible to separate the species adequately.

The behaviour of the birds was fairly typical. Flying low over land they were easily deflected by contour changes. On reaching the sea a few flocks paused and fed, but most, after varying amounts of hesitation and sometimes circling a few times, departed to sea; as they went over the sea they usually rose to a great height (reaching the limit of visibility for an observer on the cliff top) and, as at all times, were calling loudly.

It is noteworthy that none of this movement appears to have been observed at Inishtrahull in north-west Ireland (Gibbs *et al.*, 1954) which suggests that no birds passed through Islay but were all in Kintyre or to the east of it. (It is of course possible that if the birds had kept their altitude they might have passed Ininshtrahull unobserved.) Mr. A. Watson jnr. (*pers. comm.*) saw a similar movement travelling south in upper Glenfeshie in Inverness-shire on 18th October.

MOVEMENTS OF CHAFFINCHES (*Fringilla coelebs*)

Chaffinch migration was observed only in 1954 and did not commence until 4th October when birds were first seen coasting to the west at Carskiey; they were seen again on the 5th and 6th, coasting west at Carskiey and Mull in small numbers. During the big rush of birds at Borgadelmore on the 6th, 10% were Chaffinches. Apart from a single bird seen departing to the south-west at Borgadelmore on the 6th no birds were seen going away to sea. Chaffinches followed the coast to Rudha na Lice where they turned northward. Lack and Lack (1952) have suggested that because few Chaffinches are seen departing to sea in diurnal passage, such passage is a relatively unimportant part of their whole migration. In the present case their failure to depart to sea seems to have been in part at any rate due to too strong a wind (see p. 430).

DISCUSSION

The foregoing account will make it clear that a substantial passage of diurnal migrants passes through the Kintyre peninsula in autumn. It has been pointed out in the introduction that such a movement is to be expected on geographical grounds alone; birds, particularly those with a standard direction to the south-west, are probably funnelled into the peninsula from a wide area of Scotland. The origin of the birds and the route by which they traverse Scotland is at present unknown, but the observation of Mr. Watson that Fieldfares were passing through the area of the Spey Valley just prior to their appearance at Kintyre provides a useful link. Many of the pipits and perhaps some of the larks may be Scottish bred birds; it is of interest in this connection that during a week spent in the coastal areas of Wester Ross and Sutherland from 23rd to 29th August 1954, the writer saw only two Skylarks whereas large parties of pipits were collecting everywhere. Possibly the larks seen in Kintyre had crossed from the east coast and many may have been of Scandinavian origin.

The sum total of observations throws some light on the effect of prevailing weather on diurnal migration. It has already been pointed out that the peak movements of larks and pipits coincided with days on which there were light winds and on which there was no rain or mist; there is one exception to this as Meadow Pipits showed a peak on 5th October 1954 when a light mist occurred on high ground. Under conditions suitable for migration it appears that the direction of the wind may considerably modify the direction in which some species depart to sea; in an east-south-east wind in 1952 Skylarks and Meadow Pipits departed in an east or south-east direction from the south-east corner of the peninsula. In 1953 and 1954 south-west to north-west winds prevailed and these species departed from the south-west of the peninsula between S.30°W. and W.30°S. Such behaviour must profoundly influence the ultimate course of the birds in the area. Those that headed south-east would make a landfall on the Ayrshire coast between Girvan and Ballantrae (this coastline was visible on the day in question) from where they would presumably recommence a coasting movement (Fig. 2). We have not been able to repeat this observation (the same conditions have not recurred), but it should be noted that birds which do take this course will have another opportunity to make a short sea crossing to Ireland when they reach the Mull of Galloway. Those birds which depart in a south-west direction should make a landfall between Fair Head and Garron Point on the Antrim coast from where they will probably continue through Ireland as passage-migrants.

The observation that Skylarks usually departed to sea against the wind or partly against the wind is in conflict with the findings of Lack and Lack (1952) who state (p. 89): " . . . Skylarks tended to set out over the sea chiefly with a following wind or when to turn along the coast would have given them a following wind." The view is expressed below that wind direction *per se* is of only secondary importance in determining whether birds will depart to sea, in which case the Lacks' observations and ours are not irreconcilable. However, it must be stated that, after careful study of their Table II, I cannot agree with the Lacks' conclusions. This Table suggests to me that their birds behaved exactly as did those at Kintyre: while some went to sea with a following wind, the majority departed in head winds or in winds from some quarter of the arc in front of them.

It is possible that in Kintyre we are dealing with two separate races of Skylark which take different routes on migration—one through Scotland and Northern England, the other through Ireland. Although there is no evidence for or against such a theory I think it is unlikely to be true and that the birds passing through Kintyre are all part of a single great movement passing through the Irish Sea; I hope to discuss this in detail in a future paper.

These effects of wind-direction were not apparent with Fieldfares and Redwings which continued on their course toward Ireland in spite of a change in the wind from light west on the 17th to light east on the 18th. (It is unfortunate that we did not have an observer at Macharioch on the latter day.) Thrushes are stronger fliers than larks or pipits so it is to be expected that as long as the wind remains moderate its direction will not greatly alter their course.

The strength of the wind may considerably influence the departure of birds to sea and it affects different species differently; at present we have few quantitative data on the subject, but it is clear from the data at Dunaverty Point that Skylarks (strong fliers) were much more prone to depart to sea than Meadow Pipits (weak fliers) and the same was demonstrated on Mull on 6th October 1954 when most of the larks appeared to depart to sea but fewer pipits or Chaffinches, these latter species continuing to coast north after passing Rudha na Lice.

I believe that the determining factor in deciding whether or not birds will depart to sea is the strength of the wind; its direction is of much less importance except that it determines the direction in which the bird flies away from the coast. If this view is correct then it may be expected that, other things being equal, birds will depart to sea in winds of any direction irrespective of whether it is a tail wind or a head wind when related to the direction in which they " want " to travel (i.e. their standard direction). This aspect of the problem could be studied with great profit at Kintyre if continued for long enough.

The ultimate fate of birds which turn north at Rudha na Lice and continue to follow the coast is unknown. Some may take off toward Islay and re-orientate from there toward north-west Ireland. Alternatively, and I think more probably, they continue for a short way up the coast until their migratory urge is exhausted and then feed and rest before re-orientating at night or passing back into the hinterland to join the main stream on another day.

The final destination of birds passing through the Kintyre peninsula is outside the scope of the present paper. Some Skylarks may winter in Ireland and others pass through that country to winter further south. The same probably applies to pipits, but it is likely that most thrushes remain in Ireland to winter. Birds which pass out of Kintyre towards Galloway have many opportunities to rejoin the other stream further south; more observations are required from other areas to show whether this is in fact what happens.

SUMMARY

1. The diurnal migration of several Passerine species has been studied in 3 successive autumns at Kintyre, Argyllshire.

2. On reaching the south coast, birds may coast to either east or west and ultimately depart to sea towards either Galloway or Northern Ireland. This departure is probably influenced by wind-direction: in easterly winds in 1952 larks and pipits departed towards Galloway, in westerly winds in 1953 and 1954 they departed towards Ireland. Thrushes continued towards Ireland when the wind changed from west to east.

3. The strength of the wind appears important in determining whether birds leave the coasting movement and depart to sea: Skylarks (strong fliers) are less affected than Meadow Pipits (weak fliers). Wind-direction is considered to be of secondary importance and determines which way the birds travel in order to overcome drift.

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FEATHER-EATING AND PELLET-FORMATION IN THE GREAT CRESTED GREBE

By K. E. L. Simmons

In a recent account (Simmons, 1955) of an eight-year study on the life-history of the Great Crested Grebe (*Podiceps cristatus*), the habit of eating feathers was briefly reviewed in the light of new anatomical information collected by Hanzák (1952) in Czechoslovakia, which suggests a connection between feather-eating and pellet-formation. It seems worth while extending this account here in the hope of stimulating further observation. Hanzák's paper, that of Harrisson and Hollom (1932) and my own work are the chief sources of information utilized in this paper; no attempt has been made to review all the literature of the subject.

I am indebted to Dr. R. W. Storer of the Museum of Zoology, University of Michigan, for first pointing out to me the mystery of the elusive grebe-pellet, and to Major Maxwell Knight whose interesting talk to the Reading Ornithological Club on bird-pellets in general directly led to the present paper.

The habit of feather-eating itself is well-known though its documentation is rather scattered. More observations are still needed, especially on the quantity of feathers consumed. Adult Great Crested Grebes seldom, if ever, deliberately pluck feathers for their own consumption though they sometimes do so when giving feathers to the young. Most are swallowed incidentally during preening, when loose ones get detached by the nibbling bill or float in the water. Drifting feathers are sometimes picked up at other times, too. The young grebes receive feathers regularly from their parents, from the day of hatching onward. Indeed, at a nest watched by Rankin (1947), a feather was the very first item given to the first-hatched chick and, later, the second received one only two minutes after its initial meal (a small insect). The parents sometimes deliberately soak the feathers before presenting them to the chicks. The only indication of the daily total of individual feathers given to a chick is Harrisson and Hollom's record of 14 to a four-day-old one. While the adults continue to present feathers to the chicks for several weeks after hatching, they do so more frequently during the first two weeks and especially during the "guard-stage" (see Simmons, 1955), when the parents take it in turn to remain with the brood while the other forages for food. Feathers are most often given during preening bouts, the hunting adult seldom bringing them. For example, on 29th and 30th April 1954, I watched Pair A54 for just under 5 hours while the birds took turns in feeding their three chicks. The male brought food 28 times, the female 22. Only four feathers were given: two while the guarding adult preened and two after a feed of fish-fry and water-insect respectively. In addition, one of the downy young picked one off the surface of the water.

The chicks soon learn to pick up floating feathers for themselves and occasionally pluck them from the adults. When their own feathers replace the down, they swallow these as well. Thus the grebe is "capturing" and eating feathers long before it gets true food for itself.

The majority of feathers consumed are those short, satiny white ones from the under-parts. Hanzák (1952) confirms this from examining stomach contents, though he also found feathers from all parts of the body, including the tippets.

All the other grebes on the British List are known to eat feathers, the Little Grebe (*Podiceps ruficollis*) probably less frequently than the others (see *The Handbook,* Vol. IV). As long ago as 1813 Montagu recorded the habit for the Red-necked Grebe (*P. griseigena*) as well as for the Great Crested. Munro (1941) observed that the young of the American race of Red-necked Grebe plucked and ate their own down. He also reported 40 adult feathers in the stomach of a downy chick of the Western Grebe (*Aechmophorus occidentalis*), but much larger numbers were found by Chapman (1908): 238 in one, 331 in another!

The function of feather-eating, reviewed by Harrisson and Hollom (1932) and by Hanzák (1952), has caused much discussion. The former authors could find no evidence for any connection with pellet-formation. They suggested, tentatively, that: (1) the congestion of whole feathers in the stomach might partly help in protecting the walls of the digestive organs from sharp fish-bones, adding that such a precaution seemed hardly necessary in view of the strength and thickness of these organs; (2) the decomposing feathers might aid digestion in some way, though this too seemed unnecessary. Hanzák questioned the first of these on the grounds that the swallowed feathers do not line the stomach at all and thus cannot protect it in the manner indicated.

Other explanations of the behaviour reviewed by Harrisson and Hollom included: (3) the Vitamin-D theory of Rowan (1931), and (4) the "strainer-effect" theory of several writers that feathers in the stomach prevent harmful fish-bone and the like, and also hard-to-digest but useful food, from entering the intestine before being satisfactorily broken down. Hanzák also criticized this latter, considering that the net of feather "thorns" in the stomach near the pylorus probably arises by chance and in any case can "only have a subsidiary function in keeping back rough parts of the food".

Harrisson and Hollom (1932) finished their remarks with: "On the whole we are inclined to believe that the habit of eating feathers is partly a psychological one, a development of preening and perhaps of the curious weed-presentation phases in display (we have seen a male Grebe give one of his breast feathers to his mate in July)". While the connection with preening is a certain one, I found no indication of any link with display in my own work on grebe behaviour.

In his review, Hanzák (1952), apart from the remarks already mentioned, also showed that the ball of feathers in the stomach is too soft and non-resistant to aid digestion in the same way as grit does. His positive contribution to the problem consisted in proving Jirsik's (1929) suggestion that the feathers produce a felt-like substance which envelopes the sharp items *ejected* from the stomach. Hanzák states: "In each opened analysed stomach we find a certain quantity of a special mush-like substance, which under the microscope proves to be composed of fragments of radia and cilia of the swallowed feathers. Jirsik's finding that the mush-like substance envelopes bones and chitinous remains and thus makes possible their easier ejection I can also confirm . It is often rather difficult to clean bones thus enveloped. The swallowed feathers have thus really the task to help in forming the ejections, but do not take part in this in their whole form; instead they produce a felt-like substance and only this takes an active part in ejection".

Thus, it seems inescapable to conclude that grebes eat feathers for the main purpose of pellet-formation. In further support Hanzák found microscopically no trace of either bone or feather in the intestine and stated "Thus it is clear that neither the feathers nor undigested roughage pass the pyloric stomach". However, he gives no actual record of a grebe pellet, the pellet itself is unknown and no observer seems as yet to have witnessed the actual oral ejection of one. Thus the final and concrete proof of the connection between feather-eating and pellet-formation is still lacking.

The idea that grebes swallow feathers to aid the formation of their pellets was independently advanced by Knight (1948) who shows that many pellet-ejecting birds have an essential need for rough material of various sorts to assist this production and soon lose condition if denied it. While many species, notably birds-of-prey, normally obtain the necessary material incidentally from their victims, other species have to make special effort to obtain it just as the grebe does. Thus Herons (*Ardea cinerea*) at times eat a great deal of vegetable matter for this purpose (Lowe, 1954). A further class of birds form their pellets in yet another manner. Van Dobben's (1952) detailed study on the food of the Cormorant (*Phalacrocorax carbo*) was partly based on pellet examination. Each pellet is encased by a mucous membrane which, judged from the section of a large young bird, is in fact the pituitary lining of the gizzard which envelopes the undigested meal.

SUMMARY

Adult Great Crested Grebes eat feathers, mainly when preening, and also give them to the young. In the stomach these feathers break down into a special mush-like substance which envelopes fish-bone, etc., apparently to form ejectable pellets. As yet, no one seems to have seen the actual ejection of such a pellet and the pellet itself is unknown.

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PHOTOGRAPHIC STUDIES OF SOME LESS FAMILIAR BIRDS

LXXV. CRANE

Photographed by M. D. ENGLAND, ILSE MAKATSCH, I. NEUFELDT and IAN C. ROSE

(Plates 57-64)

THOUGH bearing a certain resemblance to herons, storks and other long-legged marsh birds, cranes are very different creatures in a number of ways and normally are easily separated: on the ground, they are given a rather different silhouette by the very long, curved secondaries which, hanging down behind the folded wing, give to a varying extent in different species the appearance of a large and often bushy "tail" (the true tail is very short); in the air, unlike herons, cranes hold their necks as well as their legs extended, more stiffly and less drooping than in the case of storks, from which they may also be distinguished by their flight-formation—storks and their related groups tend to fly in bunched flocks, while cranes almost invariably fly in V or line formation, even when in small parties, and to this extent have also to be separated from geese; here again, however, there should be no real difficulty, except in bad conditions or at extreme ranges, because the wing-beat of a crane is much slower and more forceful, and the extended legs should often be clearly visible (though O. Heinroth's observation, quoted in *The Handbook,* referring to the legs being drawn up in cold weather, should be borne in mind!) Finally, cranes are noisy birds and their trumpeting calls may be heard at considerable distances by day or night.

The crane family is a very old one, fossils apparently typical of the genus *Grus* occurring in the Miocene, and it is a very wide-spread one, representative species being found on every continent except South America. It is, however, in the Northern Hemisphere that the majority of the species are found, there being 4 in North America and 7 in the Palaearctic; the Common Crane (*Grus grus*) and the Demoiselle (*Anthropoides virgo*) are easily the most widespread of the latter and are the only two known to occur in Europe, the others all being rather locally distributed in Asia. The Common Crane has an interesting breeding-range extending from Norway, Sweden and Germany in a strip of 1000-1200 miles wide across eastern Europe, Russia and much of Siberia, as far at least as the Lena River in the east and north to the Arctic Circle—interesting because there are or have been isolated colonies in southern Europe as far west as Spain, in Tunisia and in Asia Minor and, of course, until the end of the 16th century the bird used to nest in England: the way that these isolated breeding-areas have been falling into disuse suggests that the Crane, at least in the south and west of its range, is still retracting. The main wintering-areas are in N. and E. Africa, India and China, with a few in parts of S. Europe and Iraq.

Our photographs this month come from Austria, Norway and S. Karelia in the north-west of the U.S.S.R., the last being the first photographs taken in Russia that we have published in our series. Plates 57, 59, 60 and 61 show the Common Crane's edition of the family's characteristically elongated and fluffy secondaries, and also give a good indication of the distribution of the colours in this species. The body is a uniform grey which sets off, quite strikingly, the blackish "tail" and the contrasting head-pattern of black face and throat and white stripe down the side—so much so that the black areas show up at a distance as noticeable dark "ends" to a grey body. There is also a red patch on the crown, but this is visible only at short distances. The bird stands quite appreciably taller than a Heron (*Ardea cinerea*) and is altogether more graceful with its longer (black) legs and its shorter (greenish-brown) bill. It moves along at a slow and sedate walk, its body horizontal and neck curved, picking up its food in the way shown on plate 63 (lower). When it is suspicious, however—and it is a very shy bird—the neck and body are stretched right up (plate 57). On the other hand, when walking away from a nest or from suspected danger (especially in the nesting area), it moves in a crouching or "creeping" attitude which is very suggestive to those familiar with the bird in its breeding-haunts: the head is lowered and the whole body flattened though the walk is unhurried and "casual" except in emergency.

As one might expect with a marsh bird that nests from the Arctic Circle to the Mediterranean, the breeding habitat is fairly varied, from wild and almost treeless mosses in the far north, to marshy meadows in the semi-cultivated and more wooded areas of central Europe, to the reedy edges of the shallow lagoons of the south: plate 58 (upper) shows a typically remote and desolate breeding-ground in the Dovrefjell of Norway; while plates 60-62 show a more "closed in" nest in reeds; Sweden, too, has a characteristic kind of closed site, for small swampy clearings in the dense pine-forests are typically utilized. Cranes being almost entirely terrestrial, their nests are never in trees like those of storks and herons—they are simply large heaps of grass, reeds, sedge or any other material available in the immediate vicinity, usually placed upon the ground but sometimes built-up in shallow water. As can be seen in several of these photographs, but particularly plate 58 (lower), the nest-heap is almost flat, without any real attempt at a cup, and the usual clutch of two eggs (sometimes only one, more rarely three) is laid upon the top. Mr. England tells us that he has twice seen "nests" where no material appeared to have been used and the eggs were laid on a large, flat tussock.

Incubation (plate 62, upper) is shared by both sexes: plate 60 shows the adult bird in the act of lowering itself to brood one egg and one chick, and illustrates the method of "disposing" of the length of leg. It is not unusual to find that one chick has hatched a while before the other, since the eggs are laid at intervals of two days, sometimes even three or four, and incubation often begins with the first. The chicks are able to leave the nest almost from the beginning and, like young Moorhens (*Gallinula chloropus*), for example, are able to swim and run freely (plate 62, lower). They are thickly covered with short down which is a rich rufous above (darkest down the centre of the back) and a paler reddish-buff below; they are rather large-headed and, even at this age, already fairly long-necked, as is indicated by the close-up on plate 63 (upper). The remaining two of Miss Neufeldt's interesting photographs (plates 63, lower, and 64) show fully-grown juveniles that are perhaps between 10 and 15 weeks old: the long, bushy secondaries are already well-developed, and the birds are in the full juvenile plumage which is like a colourless edition of the adult—a grey body, darker than that of the old bird and marked with brown, the head reddish-brown, becoming paler and greyer on the neck, and lacking completely the clear pattern of the adult. I.J.F.-L.

BRITISH RECOVERIES OF BIRDS RINGED ABROAD

Communicated by E. P. Leach

[This list continues from that published in 1952 (*antea*, vol. xlv, pp. 458-465), but is i the revised form now internationally adopted. There are a number of records o particular interest.

The Herons include a Swedish bird 15½ years old, recovered in Ireland. The second foreig Bittern recovery is noted—a Silesian bird at Nottingham in its first winter. An interestin feature of the ducks and geese is the recovery of birds marked by sportsmen's organisatio in Scandinavia, giving evidence of a more positive attitude to the value of ringing than sometimes adopted by their opposite numbers in Great Britain. Among these is the fir foreign Bean Goose of which the finder has sent in details. There is also an interestin harvest of recoveries of Shelduck marked on their German moulting-grounds and recover between the Forth and the Thames estuary, with one record from South Wales. The fir foreign-marked Hobby, Swift, Grey Wagtail, and Spotted Flycatcher to be recovered a included, and there are again many interesting records of northern waders. A Redsta was retrapped and released in Kent within a fortnight of its being ringed on a Baltic islan 3 Starlings caught in Holland in October and transported to Switzerland, lost little time i turning back to Britain for which no doubt they had been heading when intercepted.—Eds

Key to Symbols and Terms

O: Indicates bird breeding, or bred, at place of ringing.
Age: pull. (pullus)—nestling or chick, not yet flying;
juv.—young, able to fly freely (but in some cases this may mea a nestling or chick, owing to lack of unanimity in the variou Ringing Schemes);
* —full-grown (age uncertain), trapped;
ad. —adult.
V: Caught or trapped and released with ring.
+: Shot or killed by man.
×: Found dead or dying.
( ): Caught or trapped alive and not released, or released but wit ring removed.
/?/: Manner of recovery unknown.

Note: The format of the report, and the symbols and terms employed are those pu forward for international adoption at the XIth International Ornithological Congress. I the list the Ringing details are given on the first or first and second lines and the Recove data on a new line below.

Heron (*Ardea cinerea*)

Stockholm	O	pull.	3.6.47	Hangsjön: *ca.* 56°40'N. 14°30'E. (Kronober **Sweden.**
S.6563	×		15.4.51	Evie: 59°07'N. 3°09'W. (Orkney).
Stockholm	O	pull.	14.6.51	Alingsås: 57°55'N. 12°32'E. (Älvsbor **Sweden.**
S.9715	×		20.12.52	Rotherham: 53°26'N. 1°21'W. (Yorkshire).
Göteborg	O	pull.	21.5.36	Stora Hålsjö: *ca.* 57°30'N. 12°10'E. (Väste götland) **Sweden.**
E.3569	×		0.11.51	Lanesborough: 53°41'N. 7°59'W. (Longford).
Oslo	O	pull.	10.6.48	Egersund: 58°28'N. 6°00'E. (Rogalan **Norway.**
028479	×		5.9.51	Finstown: 59°01'N. 3°09'W. (Orkney).
Oslo	O	pull.	10.6.48	as above **(Norway).**
028485	×		9.11.51	Walsall: 52°40'N. 1°55'W. (Stafford).
Oslo	O	pull.	4.6.49	as above **(Norway).**
036881	×		20.8.52	Aberdour: 56°03'N. 3°18'W. (Fife).

o	O	pull.	5.6.50	as above **(Norway).**
989	+		0.2.51	Loch Assynt: 58°10′N. 5°00′W. (Sutherland).
o	O	pull.	5.6.50	as above **(Norway).**
993	/?/		20.1.51	Roy Bridge: 56°53′N. 4°40′W. (Inverness).
o	O	pull.	5.6.50	as above **(Norway).**
022	×		22.1.51	Isle of Ulva: 56°28′N. 6°13′W. (Argyll).
o	O	pull.	5.6.50	as above **(Norway).**
009	×		25.4.51	Satterthwaite: 54°20′N. 3°02′W. (Lancashire).
lo	O	pull.	10.6.50	as above **(Norway).**
040	×		11.5.51	Ollaberry: 60°30′N. 1°21′W. (Shetland).
lo	O	pull.	10.6.50	as above **(Norway).**
047	×		28.2.51	Walls: 60°13′N. 1°35′W. (Shetland).
lo	O	pull.	10.6.50	as above **(Norway).**
028	×		26.3.51	Glen Clova: 56°50′N. 2°10′W. (Angus).
lo	O	pull.	12.6.51	as above **(Norway).**
562	×		9.5.52	Kelso: 55°36′N. 2°26′W. (Roxburgh).
lo	O	pull.	22.5.52	as above **(Norway).**
708	×		11.12.52	Renfrewshire.
lo	O	pull.	22.5.52	as above **(Norway).**
687	V		7.2.54	Romford: 51°35′N. 0°11′E. (Essex).
lo	O	pull.	22.5.52	as above **(Norway).**
688	+		0.11.52	Lisdoonvarna: 53°02′N. 9°17′W. (Clare).
lo	O	pull.	10.6.53	as above **(Norway).**
783	×		0.3.54	Westray: 59°17′N. 3°00′W. (Orkney).
vanger 45	O	pull.	24.5.53	Stangvik: 62°53′N. 8°32′E. (Nordmöre) **Norway.**
	×		8.3.54	Rousay: 59°10′N. 3.°00′W. (Orkney).
vanger	O	pull.	14.6.53	as above **(Norway).**
53	×		0.1.54	Farr: 57°21′N. 4°11′W. (Inverness).
den	O	pull.	13.6.51	Terschelling: 53°22′N. 5°14′E. **Holland.**
671	×		16.8.51	Whitstable: 51°22′N. 1°02′E. (Kent).

It will be noticed that the Heron Göteborg E.3569 was over fifteen years old.

Bittern (*Botaurus stellaris*)

dolfzell 743	O	pull.	5.6.52	Hoyerswerda: 51°26′N. 14°15′E. (Silesia) **Germany.**
	V		5.12.52	Nottingham: 52°57′N. 1°08′W.

The only other Bittern recorded also had a German ring and had been rked in Saxony in 1931. It was recovered in Cheshire in January 1932.

Mallard (*Anas platyrhynchos*)

lsingfors	O	juv.	31.7.52	Rauma: 61°08′N. 21°30′E. **Finland.**
11644	×		3.12.52	Bridlington: 54°05′N. 0°10′W. (Yorkshire).
rges Jeg. Forb. 5	O	juv.	15.7.52	Elverum: 60°50′N. 11°30′E. (Hedmark) **Norway.**
	+		0.12.53	Ellon: 57°22′N. 2°04′W. (Aberdeen).
vanger	O	juv.	4.6.46	Line: 58°43′N. 5°38′E. (Rogaland) **Norway.**
29	+		5.1.51	Lumphanan: 57°10′N. 2°35′W. (Aberdeen).
ckholm 3409	*	ad.	18.5.49	Hedemora: 60°16′N. 15°59′E. (Kopparberg) **Sweden.**
	+		29.12.51	North Creake: 52°55′N. 0°46′E. (Norfolk).

During the period under review, all the records of Mallard ringed from coys are from Belgium and Holland and the birds were found distributed er Great Britain and Ireland, though strangely there has never been one m Wales. Those above are set out in detail as referring to birds ringed the breeding locality and as such perhaps of greater interest.

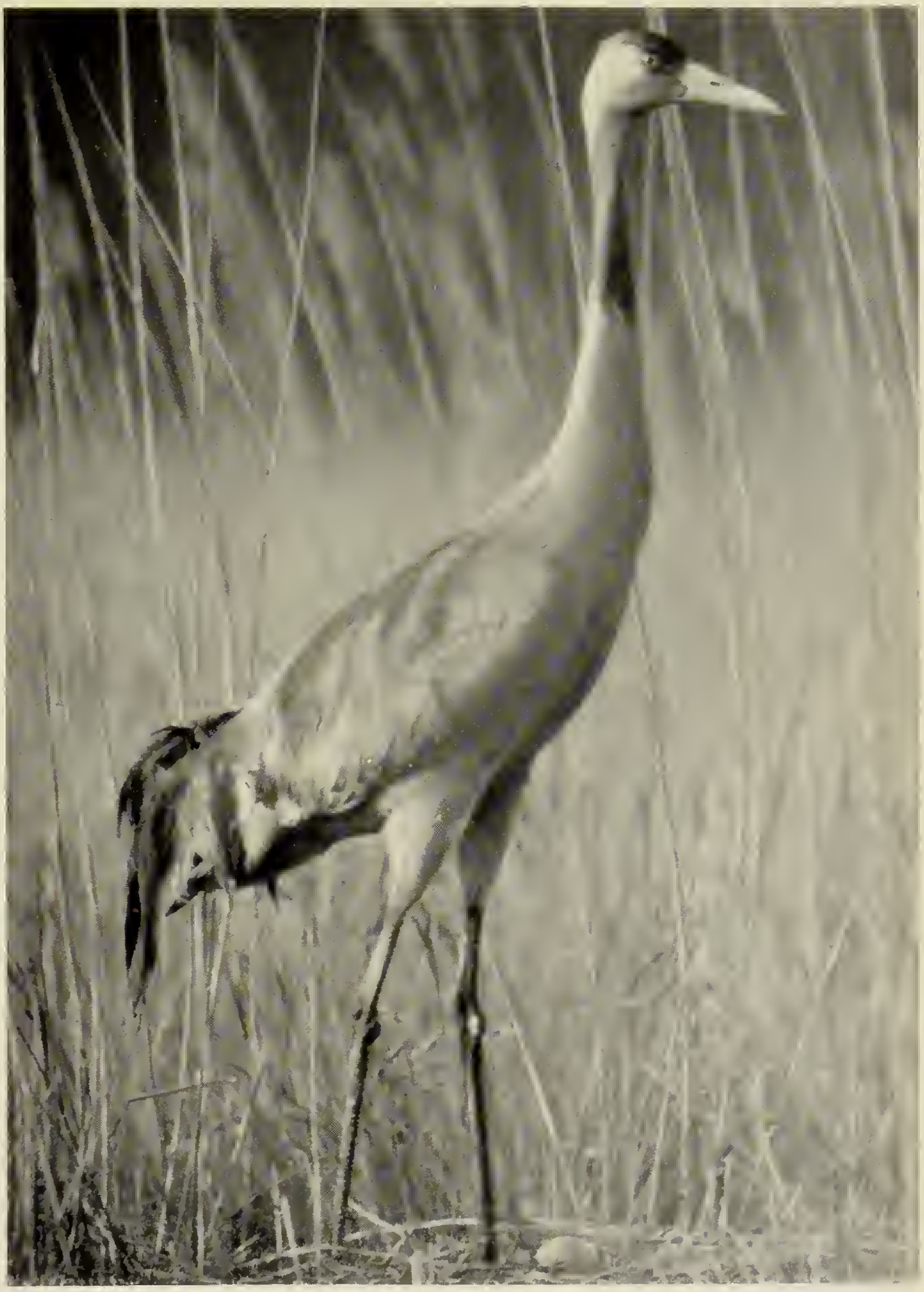
Teal (*Anas crecca*)

Moscow	*		23.7.51	Volga Delta: 46°14'N. 49°02'E. (Astrakhan **Russia.**
221921 E.	+		0.1.52	Sligo: 54°16'N. 8°29'W.
Moscow	O	juv.	22.6.52	Strenszy: 57°38'N. 25°42'E. **Latvia.**
184789 E.	+		13.11.52	Lampeter: 52°07'N. 4°04'W. (Cardigan).
Reykjavik	O	juv.	8.8.49	Arnanes: 66°08'N. 16°44'W. **Iceland.**
43333	+		11.11.53	Kellas: 57°34'N. 3°24'W. (Morayshire).
Reykjavik	O	juv.	10.7.50	as above **(Iceland).**
43463	+	♂	19.2.54	Queenstown Harbour: 51°51'N. 8°17'W (Cork).
Reykjavik	O	juv.	21.7.50	Myvatn: 65°39'N. 16°58'W. **Iceland.**
5/1176	+	♂	29.1.54	Perth: 56°23'N. 3°26'W.
Reykjavik	O	juv.	9.8.53	Fnjóskadalur: 65°46'N. 17°53'W. **Iceland.**
67340	+	♂	10.1.54	Grinsdale: 54°55'N. 3°00'W. (Cumberland).
Oslo	O	juv.	16.6.38	Heskestad: 58°30'N. 6°22'E. (Rogaland **Norway.**
07695	+		*ca.* 23.1.40	Killarney: 52°04'N. 9°31'W. (Kerry).
Copenhagen	*	♂	25.10.49	Copenhagen: 55°41'N. 12°35'E. **Denmark.**
595658	+		26.12.50	Market Drayton: 52°55'N. 2°29'W. (Shropshire).
Copenhagen	*	♀	26.10.49	as above **(Denmark).**
692609	+		15.1.50	Galway: 53°17'N. 9°04'W.
Copenhagen	*	♀	30.11.49	as above **(Denmark).**
692921	+		31.1.50	Stoke Climsland: 50°33'N. 4°18'W (Cornwall).
Copenhagen	*	♂	3.7.50	as above **(Denmark).**
693576	+		31.12.50	Hull: 53°45'N. 0°20'W. (Yorkshire).
Copenhagen	*	♀	1.11.50	as above **(Denmark).**
596051	+		5.12.50	Northampton: 52°14'N. 0°54'W.
Copenhagen	*	♂	16.11.50	as above **(Denmark).**
596091	+		26.12.50	Blythburgh: 52°19'N. 1°36'E. (Suffolk).
Copenhagen	*		24.10.51	Amager: 55°40'N. 12°38'E. **Denmark.**
597106	+		28.1.52	Rich Hill: 54°22'N. 6°33'W. (Armagh).
Copenhagen	*		8.11.49	Copenhagen, **Denmark.**
692690	+		5.1.53	Castle Douglas: 54°56'N. 3°56'W. (Kirkcudbright).
Copenhagen	*		13.10.50	as above **(Denmark).**
596009	+		0.1.54	Kinnity: 53°06'N. 7°44'W. (Offaly).
Helgoland	*		18.7.51	Wangeroog: 53°47'N. 7°57'E. **East Frisian Is**
5025827	+		1.1.52	Perth: 56°23'N. 3°26'W.

The number of Teal from decoys in Holland is very large indeed and a great many have also been recovered with rings of the Brussels Ringing Scheme. Neither of these groups is listed in detail. The decoy at Copenhagen is of much more recent institution and records from this station have not previously been published. The other records listed, refer to Teal ringed in the breeding-place or, in the case of the one from the Volga Delta, at a special moulting-locality.

Gadwall (*Anas strepera*)

Reykjavik	O	juv.	4.8.53	Myvatn: 65°39'N. 16°58'W. **Iceland.**
33511	+		20.1.54	Lough Neagh: *ca.* 54°31'N. 6°26'W. (Armagh).
Reykjavik	O	juv.	4.8.53	as above **(Iceland).**
43207	×		2.3.54	Eglinton: 55°02'N. 7°11'W. (Londonderry).
Leiden	*	ad. ♂	14.7.50	Zwarte Meer: 52°38'N. 6°00'E. (Overijssel) **Holland.**
240076	+		26.1.52	Thetford: 52°25'N. 0°45'E. (Norfolk).
Leiden	*	ad.	28.9.51	Doornspijk: 52°25'N. 5°49'E. (Gelderland) **Holland.**
251401	+		31.1.52	South Pickenham: 52°36'N. 0°45'E. (Norfolk).



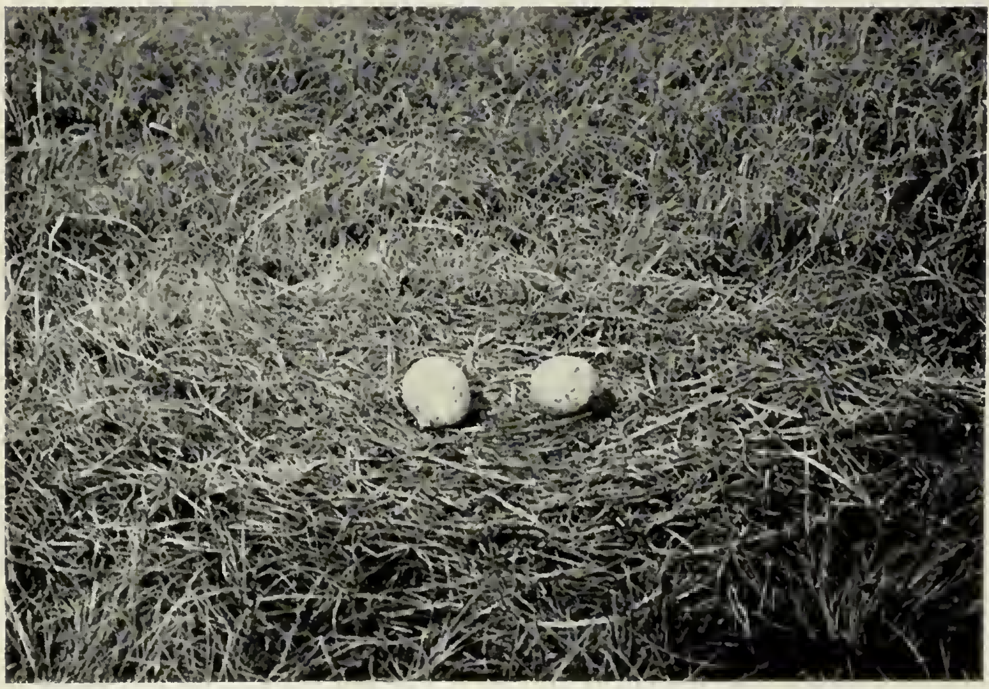
Ilse Makatsch

CRANE (*Grus grus*) AT NEST: AUSTRIA, APRIL 1952
This shows particularly well the general shape and stance of a Crane on the alert—the bird is appreciably taller than a Heron (*Ardea cinerea*)—and gives a good impression of the characteristically drooping, bushy "tail", blackish in colour, which is formed by the very long, curved secondaries (see pages 435-437).

M. D. England

BREEDING-GROUND OF CRANE (*Grus grus*): DOVREFJELL, NORWAY

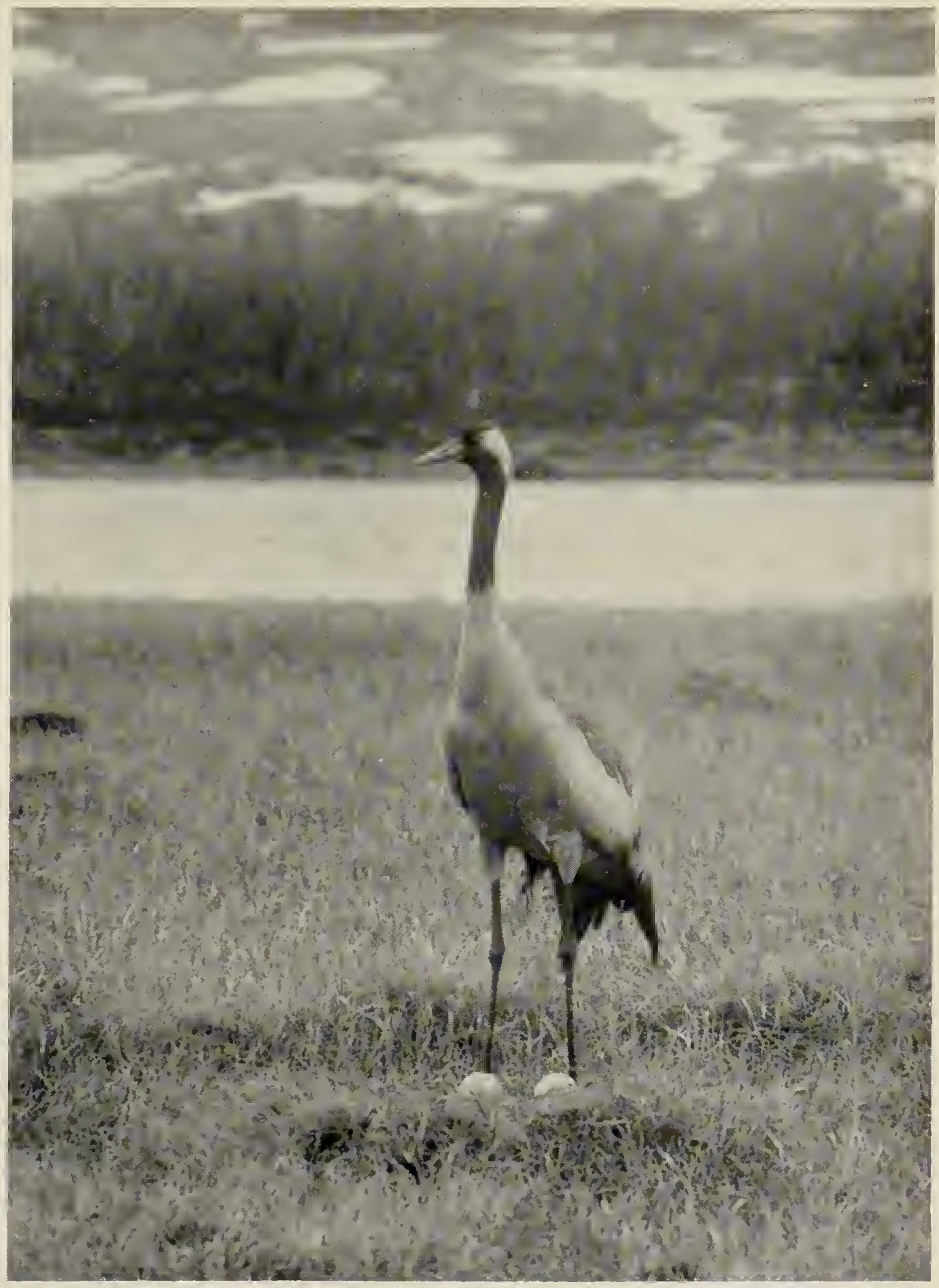
This is typical of one of the habitat-types, which vary from the desolate and almost treeless northern mosses to marshy meadows in semi-cultivated areas and the reedy edges of shallow lagoons.



Ian C. Rose

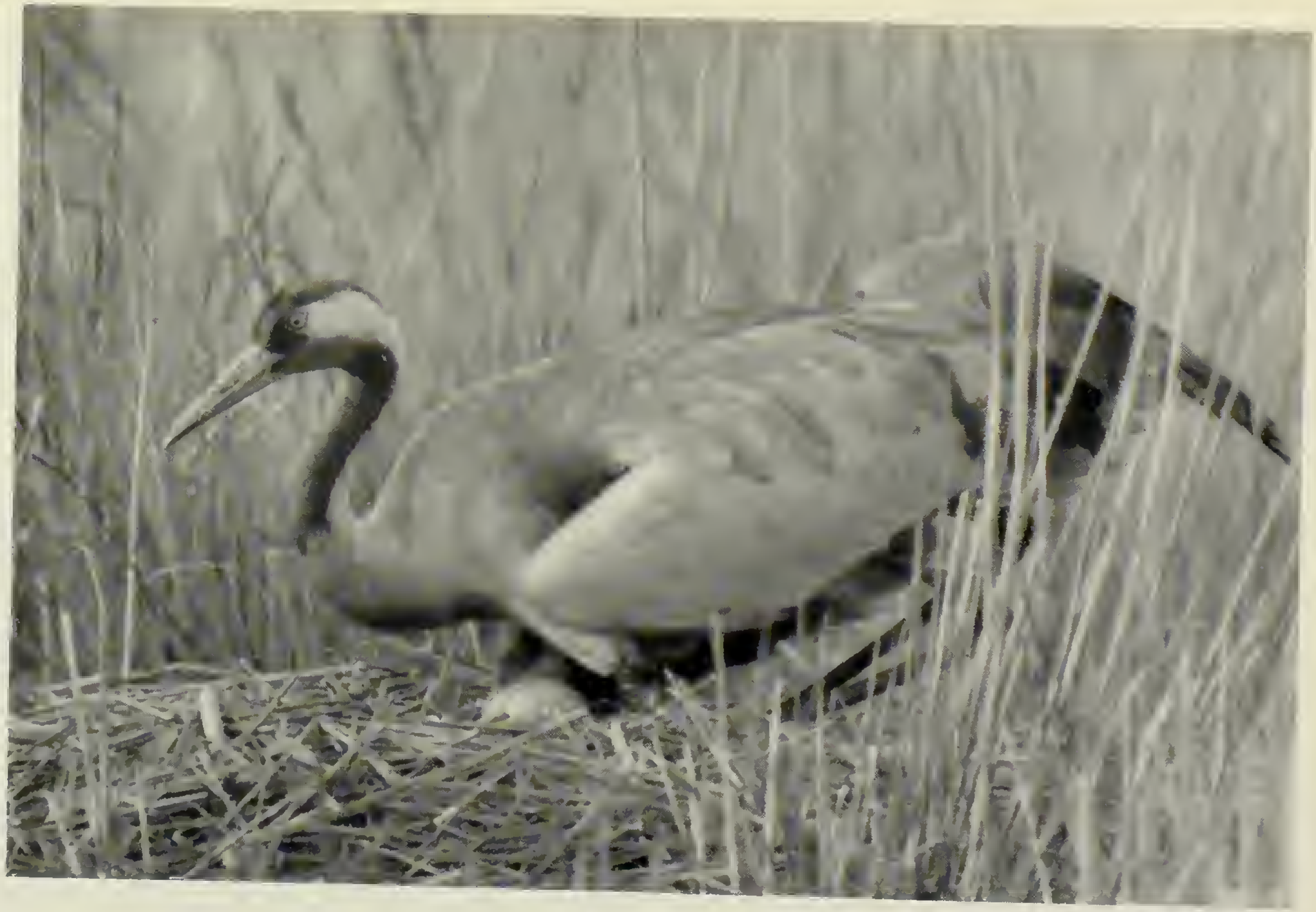
NEST AND EGGS OF CRANE (*Grus grus*): DOVREFJELL, NORWAY

The nest is simply a flat-crowned heap made of any available vegetation, placed upon the ground or built up in shallow water, and the eggs, usually two in number, are laid on the level top (see page 437).



M. D. England

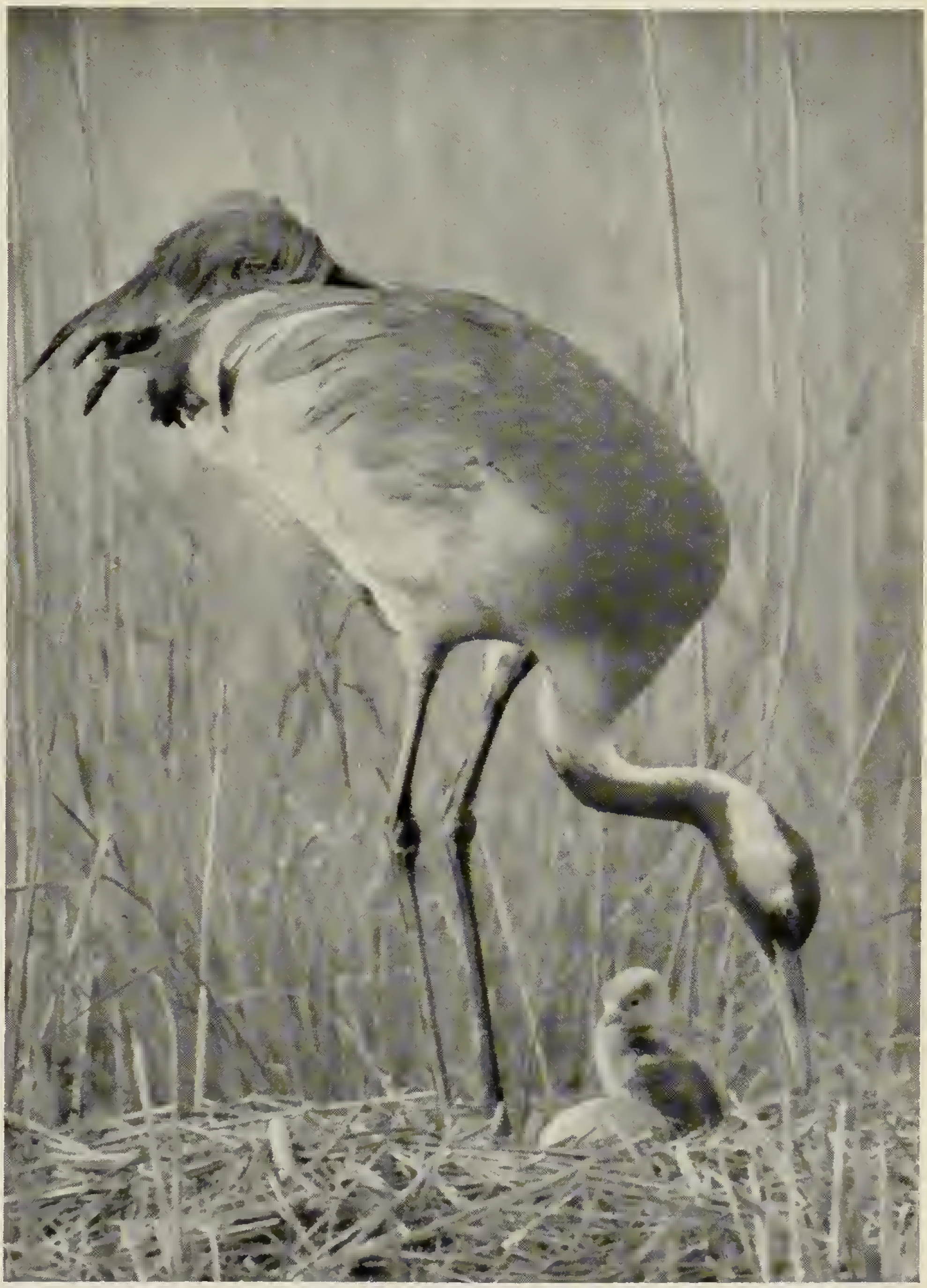
ADULT CRANE (*Grus grus*) AT NEST: DOVREFJELL, NORWAY
Here one can see the general plumage effect of a grey body set off by black at each "end". The head-pattern is one of striking contrast with the black face and throat, the broad white line from behind the eye down the side, and, just discernible here, the red patch on the crown (see page 436).



Ilse Makatsch

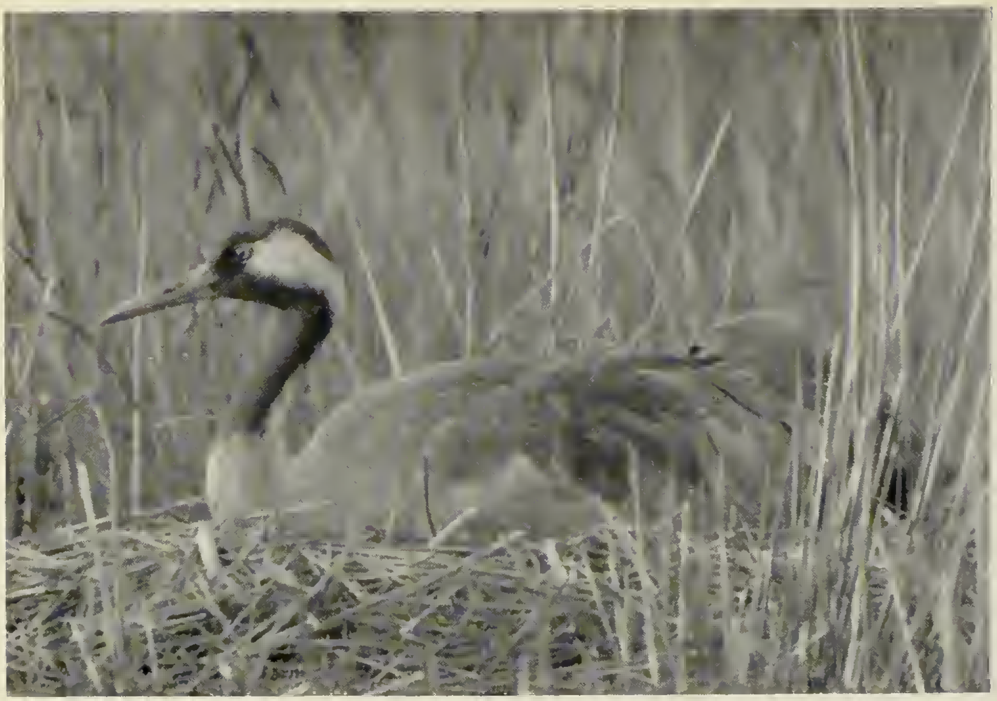
CRANE (*Grus grus*) SETTLING ON NEST: AUSTRIA, APRIL 1952

A Crane uses it folded wings as "fore-legs" in lowering itself on to the eggs and this photograph was evidently taken just before the carpal joints reached the "ground". The full extent of the long secondaries can be appre-ciated here and one gets a good idea of the



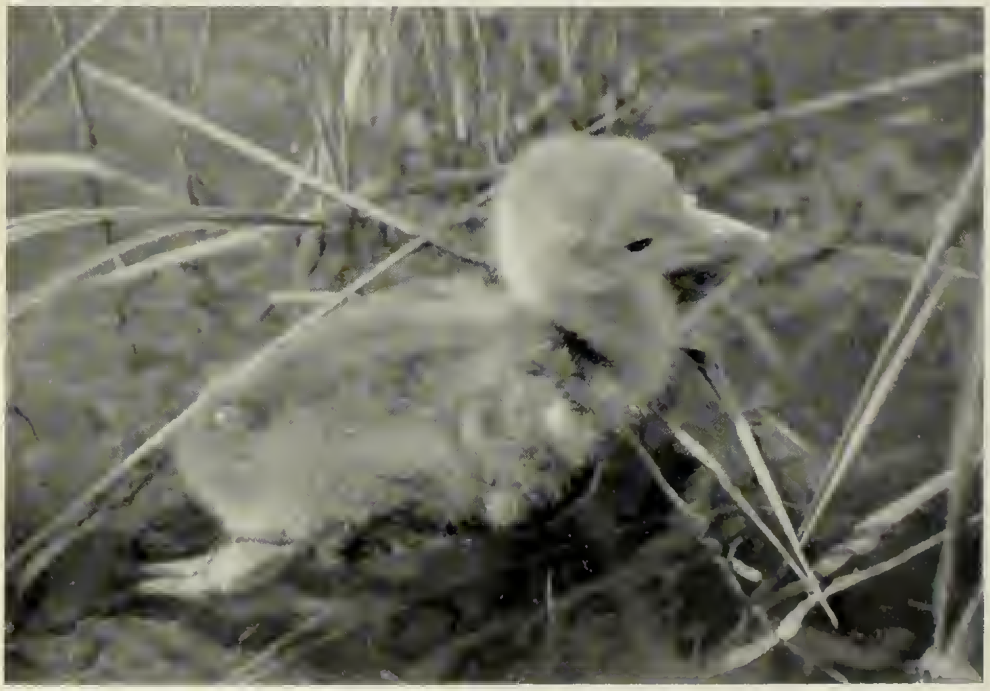
Ilse Makatsch

Crane (*Grus grus*) at nest: Austria, April 1952
The Crane is a most graceful bird, whether it is walking sedately on its long black legs, standing alert (plate 57) or feeding (plate 63, lower). Here one egg has hatched in advance of the other, and this is usual because the eggs are laid at two-day intervals and incubation normally begins with the first (see page 437).



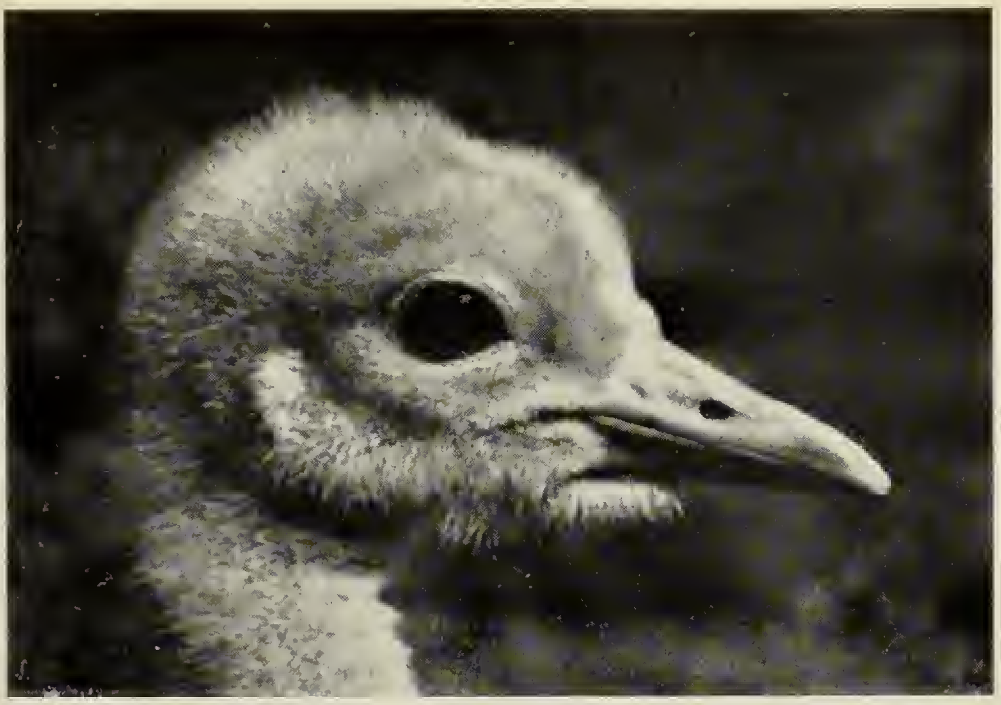
Ilse Makatsch

Crane (*Grus grus*) on nest: Austria, April 1952
Both sexes share in the incubation. The nest, the same as that in the preceding two plates, is typical of the reed-sites of southern Europe and can be compared with the waterside-marsh site shown in plate 59.



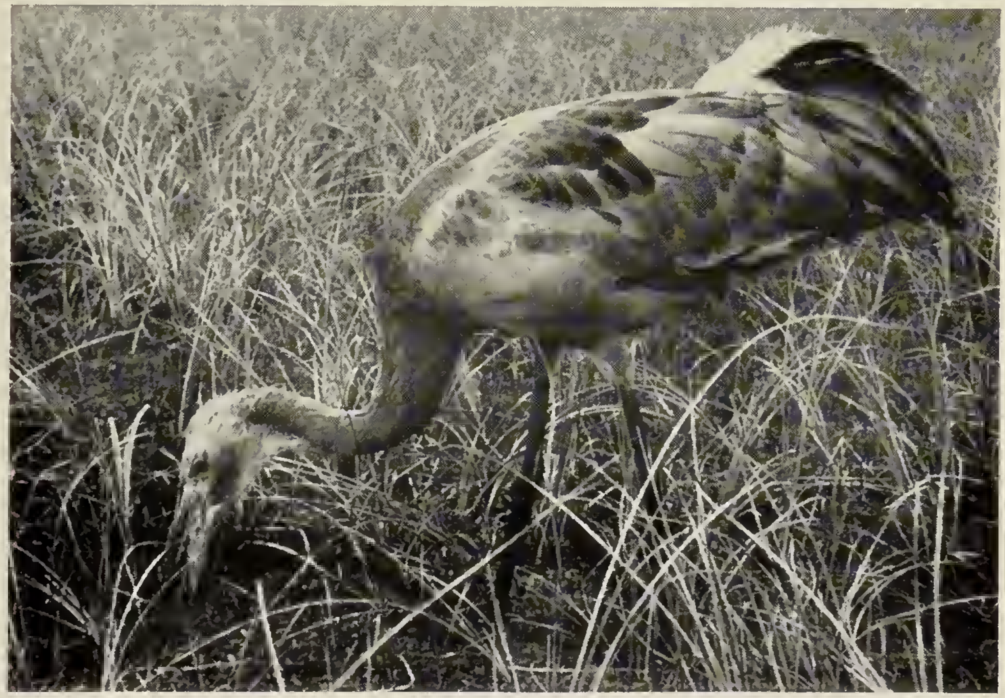
Ilse Makatsch

Newly-hatched Crane (*Grus grus*) swimming
Almost as soon as they are born, the chicks are well able to swim. Above, they are thickly covered with rich rufous down, darkest on the back and palest on the head and neck; below, they are paler reddish-buff (see page 437).



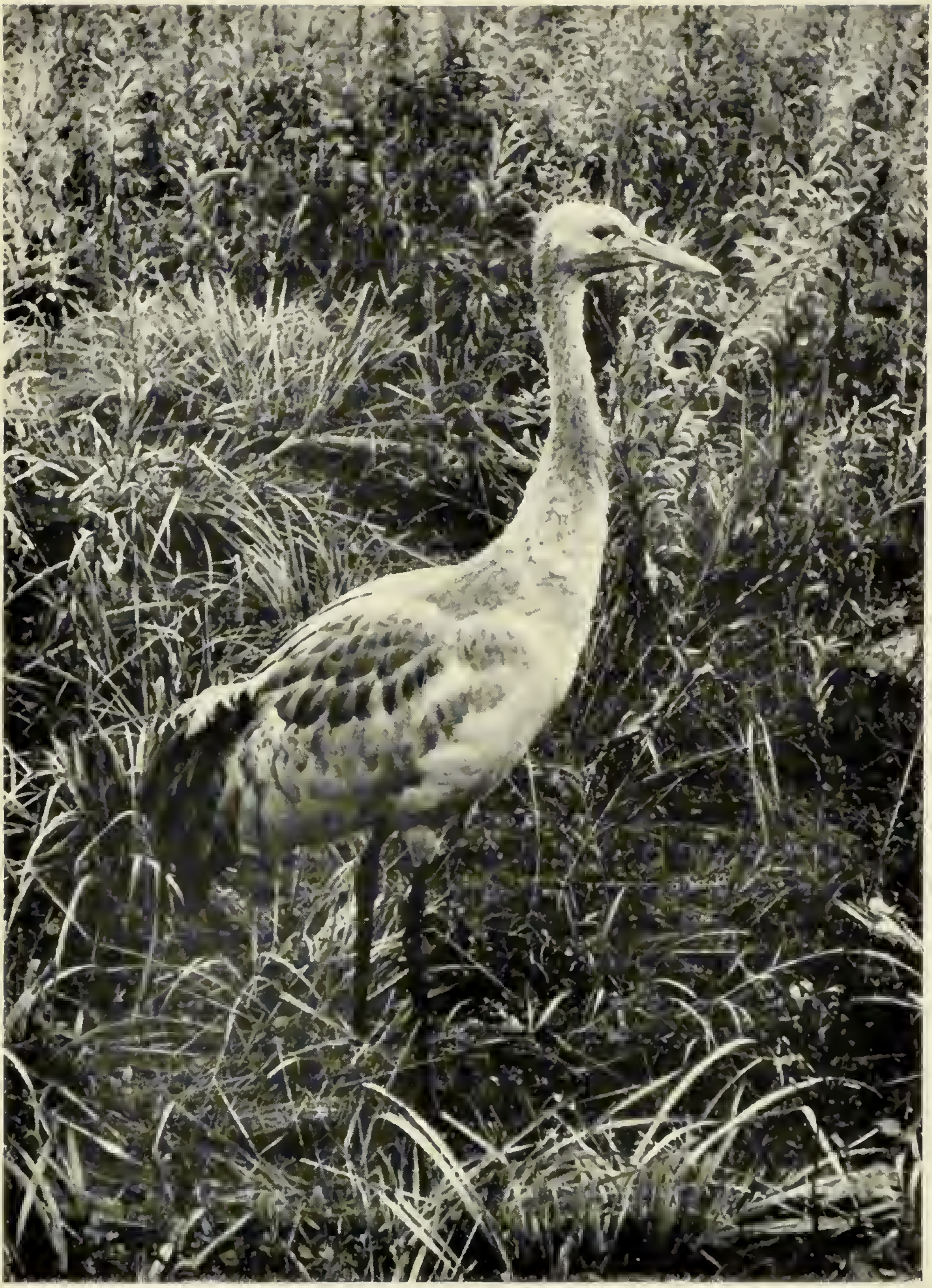
I. Neufeldt

YOUNG CRANE (*Grus grus*): S. KARELIA, U.S.S.R., JUNE 1955
An unusual close-up showing the large head on the rather thin neck. The young are cared for by both sexes, but at this age each parent may take charge of one.



I. Neufeldt

JUVENILE CRANE (*Grus grus*): S. KARELIA, U.S.S.R., OCTOBER 1955
This bird is probably about 15 weeks old. It is feeding in the way characteristic of cranes, with the body held more horizontally than is the case with herons and the neck curved (see page 437).



I. Neufeldt

Juvenile Crane (*Grus grus*): S. Karelia, U.S.S.R., September 1955

This bird is probably no more than 10-12 weeks old, but the characteristic "tail" is already well-developed. The juvenile plumage lacks all the colour of the adult's: the body is grey but a darker grey than that of the old bird and marked with brown, while the head is greyish-brown, becoming paler and greyer on the neck (see page 437).

Wigeon (*Anas penelope*)

eykjavik	O	ad. ♀	10.6.51	Myvatn: 65°39′N. 16°58′W. **Iceland.**
1193	+		26.12.53	Ennis: 52°51′N. 8°59′W. (Clare).
eykjavik	O	juv.	19.7.53	Fnjóskadalur: 65°46′N. 17°53′W. **Iceland.**
720	+		29.11.53	Trawbreaga Bay: 55°20′N. 7°21′W. (Donegal).
eykjavik	O	juv.	26.7.53	as above **(Iceland).**
723	+		26.12.53	Llandrillo: 52°50′N. 3°31′W. (Merioneth).
eykjavik	O	juv.	25.7.54	as above **(Iceland).**
744	+		17.11.54	Loch Watten: 58°29′N. 3°18′W. (Caithness).
eykjavik	O	juv.	5.7.51	Borgarfjord: 64°38′N. 21°32′W. **Iceland.**
000925	+		24.11.52	Grey Abbey: 54°32′N. 5°33′W. (Down).
oscow	O	ad. ♂	21.7.49	Pavlodarsk: 50°20′N. 76°00′E. **Siberia.**
1225 D.	+		29.1.54	Chichester: 50°50′N. 0°47′W. (Sussex).
penhagen	*		5.10.51	Amager: 55°40′N. 12°38′E. **Denmark.**
6286	+		23.9.52	Horsey: 52°44′N. 1°40′E. (Norfolk).
iden	*	ad. ♂	14.1.51	Terschelling: 53°22′N. 5°14′E. **Holland.**
5159	+		23.1.53	Boston: 52°58′N. 0°01′W. (Lincoln).
iden	*	ad. ♂	14.1.51	as above **(Holland).**
5151	+		21.1.54	Cliffe Marshes: 51°29′N. 0°30′E. (Kent).
iden	*	♀	13.10.52	Texel: 53°05′N. 4°50′E. **Holland.**
9940	+		30.1.54	Bossington: 51°14′N. 3°34′W. (Somerset).
iden	*	ad. ♂	11.6.51	Zwaagdijk: 52°40′N. 5°04′E. **Noord Holland.**
2540	+		2.1.53	Grantham: 52°54′N. 0°38′W. (Lincoln).
iden	*	ad. ♂	29.11.51	't Zand: 52°51′N. 4°46′E. **Noord Holland.**
0121	×		16.12.52	North Cotes: 53°29′N. 0°02′E. (Lincoln).
iden	*	♀	18.11.52	Lekkerkerk: 51°55′N. 4°43′E. **Zuid Holland.**
3807	+		18.2.53	Aldcliffe: 54°02′N. 2°50′W. (Lancashire).
iden	*	♂	18.12.53	as above **(Zuid Holland).**
3470	+		6.2.54	Maidstone: 51°16′N. 0°31′E. (Kent).
ussels	*		0.1 or 0.2.49	Meetkerke: 51°14′N. 3°09′E. **West Flanders.**
5818	+		26.1.54	Teynham Marshes: 51°21′N. 0°49′E. (Kent).

Pintail (*Anas acuta*)

eykjavik	O	juv.	19.7.53	Fnjóskadalur: 65°46′N. 17°53′W. **Iceland.**
713	+		5.2.54	Thurles: 52°41′N 7°49′W. (Tipperary).
oscow	*	ad. ♂	4.8.49	Volga Delta: 46°14′N. 49°02′E. **Russia.**
8619 D.	+		15.10.50	Burton Marshes: 53°16′N. 3°02′W. (Cheshire).
iden	*	ad.	2.9.50	Oudesluis: 52°50′N. 4°49′E. **Noord Holland.**
5585	V		1.11.51	Killorglin: 52°07′N. 9°47′W. (Kerry).

Shoveler (*Spatula clypeata*)

iden	O	juv.	30.7.53	Warmond: 52°13′N. 4°32′E. **Zuid Holland.**
1809	+		1.9.53	Lough Beg: 54°47′N. 6°29′W. (Antrim).

Scaup (*Aythya marila*)

eykjavik	O	ad. ♀	7.7.50	Myvatn: 65°39′N. 16°58′W. **Iceland.**
079	+		6.2.54	Chichester: 50°50′N. 0°47′W. (Sussex).
eykjavik	O	juv.	12.8.53	as above **(Iceland).**
878	+		0.10.53	Lough Beg: 54°47′N. 6°29′W. (Antrim).

Tufted Duck (*Aythya fuligula*)

eykjavik	O	juv.	20.7.47	Myvatn: 65°39′N. 16°58′W. **Iceland.**
000177	+		Winter 47/48	Castlecaulfield: 54°31′N. 6°51′W. (Tyrone).
eykjavik	O	juv.	21.7.47	as above **(Iceland).**
000188	+		24.1.54	Lough Glore: 53°42′N. 7°15′W. (Westmeath).

Reykjavik	O	ad. ♀	29.7.49	as above **(Iceland).**
4/3018	+		25.1.53	Ennis: 52°51′N. 8°59′W. (Clare).
Reykjavik	O	ad. ♀	28.6.50	as above **(Iceland).**
4/3045	+		15.2.53	Carrick-on-Shannon: 53°57′N. 8°06′W. (Leitrim).
Reykjavik	O	ad. ♀	18.7.52	as above **(Iceland).**
4/3086	+		3.1.53	Lough Erne: *ca.* 54°30′N. 7°50′W. (Fermanagh).
Reykjavik	O	juv.	20.7.53	as above **(Iceland).**
C.842	+		7.11.53	Lough Neagh: *ca.* 54°31′N. 6°26′W. (Armagh).

Pochard (*Aythya ferina*)

Leiden	*	ad. ♂	27.1.54	Lekkerkerk: 51°55′N. 4°43′E. **Zuid Holland.**
271745	+		31.1.54	Newhaven: 50°47′N. 0°03′E. (Sussex).

Goldeneye (*Bucephala clangula*)

Stockholm	O	ad.	12.6.49	Hällefors: 59°46′N. 14°32′E. (Örebro) **Sweden.**
TB.40	+		14.1.51	Windermere: 54°23′N. 2°55′W. (Westmorland).

Shelduck (*Tadorna tadorna*)

Caught while in moult.

Helgoland	*		17.8.52	Estuary of River Weser: *ca.* 53°50′N. 8°20′E. **Germany.**
358386	( )		2.6.54	Burnham: 52°58′N. 0°43′E. (Norfolk).
Helgoland	*		24.8.52	as above **(Germany).**
358230	×		4.7.54	South Queensferry: 55°59′N. 3°24′W. (West Lothian).
Helgoland	*		31.8.52	as above **(Germany).**
365791	×		23.3.54	Elmley: 51°22′N. 0°47′E. (Kent).
Helgoland	*		24.8.52	as above **(Germany).**
358210	+		26.1.54	Wellingborough: 52°18′N. 0°41′W. (Northampton).
Helgoland	*		31.8.52	as above **(Germany).**
365844	+		5.12.54	Kidwelly: 51°44′N. 4°18′W. (Carmarthen).
Helgoland	*		9.8.53	as above **(Germany).**
367203	+		30.1.54	Cliffe: 51°29′N. 0°30′E. (Kent).

Grey Lag Goose (*Anser anser*)

Reykjavik	O	pull.	7.7.54	Fnjóskadalur: 65°46′N. 17°53′W. **Iceland.**
21803	+		1.10.54	Aviemore: 57°11′N. 3°50′W. (Inverness).
Helgoland		juv. hand-reared	1953	Dülmen: 51°50′N. 7°16′E. (Westphalia) **Germany.**
237470	×	(wires)	3.2.54	Romney Marsh: 51°03′N. 0°55′E. (Kent).

White-fronted Goose (*Anser albifrons*)

The recoveries of the Greenland sub-species (*A. a. flavirostris*) ringed with rings of the Copenhagen Museum, come as in former lists chiefly from Ireland, and in the period now covered, i.e. 1951-1954, the records show 33 from the counties of Wexford (21), Roscommon (4), Mayo (3), Leitrim (3) and Sligo (1) and one from the Shannon, county not specified. In Scotland the records are from Argyll (5), Kirkcudbright (1) and Angus (1); and in England from Westmorland (1) and Somerset (1).

Bean Goose (*Anser arvensis arvensis*)

enska Jäg. Forb.	O	pull.	20.6.53	Fjälpfjället: *ca.* 64°N. 15°E. (Jämtland) **Sweden.**
447	+		16.1.54	Ellington: 55°13′N. 1°34′W. (Northumberland).

This is the first Bean Goose to be reported although others bearing Swedish ngs are known to have been shot in south-eastern Scotland, but it has been mpossible to obtain particulars.

Pink-footed Goose (*Anser arvensis brachyrhynchus*)

Large numbers of birds ringed as adult and young on the breeding-grounds central Iceland in 1951 and 1953 with rings of the Reykjavik Museum, ere recovered on all the well-known goose-grounds in the areas Solway, ibble, Humber and Wash as well as in Scotland in Forth and Tay districts, om Angus to Aberdeenshire, and in the most northerly counties. In Ireland coveries were reported from the counties of Antrim, Down, Westmeath, oscommon and Kerry.

Sparrowhawk (*Accipiter nisus*)

vanger	O	pull.	20.6.52	Evje: 58°39′N. 7°47′E. (Agder) **Norway.**
53	+		17.9.52	Ringwood: 50°51′N. 1°48′W. (Hampshire).

Hobby (*Falco subbuteo*)

ckholm	O	pull.	20.7.53	Älvkarleö: 60°33′N. 17°28′E. (Uppsala) **Sweden.**
0902				
	+		23.9.53	Hickling: 52°45′N. 1°35′E. (Norfolk).

A Hobby has not before been reported in Britain with a foreign ring.

Peregrine (*Falco peregrinus*)

ckholm	O	pull.	6.7.47	Luleå: 65°35′N. 22°10′E. (Norrbotten) **Sweden.**
.4193				
	+		28.11.51	Orslow: 52°45′N. 2°18′W. (Shropshire).

Kestrel (*Falco tinnunculus*)

lo	O	pull.	26.6.49	Vestre Slidre: 61°06′N. 8°58′E. (Valdres) **Norway.**
62	+		25.10.49	Ardfert: 52°19′N. 9°47′W. (Kerry).
iden	O	pull.	29.6.53	Island of Schouwen: 51°42′N. 3°50′E. **Holland.**
601	×	(drowned)	31.8.53	Dirleton: 56°03′N. 2°46′W. (East Lothian).

Moorhen (*Gallinula chloropus*)

penhagen	*		20.8.51	Amager :55°40′N. 12°38′E. **Denmark.**
236	×	(dog)	19.12.54	North Curry: 51°02′N. 2°58′W. (Somerset).

Oystercatcher (*Haematopus ostralegus*)

iden	O	juv.	10.7.50	Heerenveen: 52°58′N. 5°55′E. (Friesland) **Holland.**
2395				
	×		11.5.51	Lytham-St. Annes: 53°45′N. 3°00′W. (Lancashire).
iden	O	juv.	18.7.51	Terschelling: 53°22′N. 5°14′E. **Holland.**
2903				
	×	*ca.*	12.2.53	Sunk Island: Humber: 53°39′N. 0°05′W. (Yorkshire).

Lapwing (*Vanellus vanellus*)

Stockholm	O	pull.	6.5.48	Rone: 57°12'N. 18°30'E. Gotland, **Sweden.**
X.10390	×		24.1.51	Malltraeth Bay: 53°11'N. 4°23'W. (Anglesey).
Stockholm	O	pull.	27.5.50	Lidköping: 58°30'N. 13°10'E. (Skaraborg) **Sweden.**
X.12407	×		3.2.52	Arklow: 52°48'N. 6°09'W. (Wicklow).
Göteborg	O	pull.	10.6.48	Halmstad: 56°40'N. 12°53'E. (Halland) **Sweden.**
C.51407	×		7.12.52	Athboy: 53°37'N. 6°55'W. (Meath).
Stavanger	O	pull.	20.5.46	Klepp: 58°44'N. 5°32'E. (Rogaland) **Norway.**
62265	×		1.2.54	Newquay: 50°24'N. 5°54'W. (Cornwall).
Stavanger	O	pull.	3.6.49	Höyland: 58°48'N. 5°47'E. (Rogaland) **Norway.**
77448	+		5.1.51	Mogeely: 51°56'N. 8°03'W. (Cork).
Stavanger	O	pull.	15.5.50	Line: 58°43'N. 5°38'E. (Rogaland) **Norway.**
78458	×		7.2.54	Hayle: 50°10'N. 5°25'W. (Cornwall).
Stavanger	O	pull.	17.5.51	Sola: 58°53'N. 5°38'E. (Rogaland) **Norway.**
21981	+		24.11.51	Co. Westmeath.
Stavanger	O	pull.	24.5.51	Revtangen: 58°45'N. 5°30'E. (Rogaland) **Norway.**
23023	×		26.12.53	Kegworth: 52°51'N. 1°16'W. (Leicester).
Stavanger	O	pull.	7.6.51	as above **(Norway).**
78177	+		18.1.53	Kilkenny: 52°39'N. 7°15'W.
Stavanger	O	pull.	25.5.53	Idsal: 58°59'N. 6°00'E. (Rogaland) **Norway.**
79048	+		6.1.54	Carlow: 52°51'N. 6°51'W.
Stavanger	O	pull.	30.5.54	Herikstad: 58°43'N. 5°40'E. (Rogaland) **Norway.**
609634	×		20.12.54	West Hartlepool: 54°42'N. 1°11'W. (Durham).
Copenhagen	O	pull.	13.5.51	Korsör: 55°21'N. 11°10'E. (Zealand) **Denmark.**
694444	×		29.11.52	South Elmham-St. Peter: 52°44'N. 0°57'E. (Norfolk).
Skovgaard	O	pull.	15.5.48	Venö: 56°33'N. 8°38'E. (Jutland) **Denmark.**
S.23710	×		1.2.52	Brideswell: 53°27'N. 8°06'W. (Roscommon).
Skovgaard	O	pull.	30.5.48	Skovsted: 57°01'N. 8°50'E. (Jutland) **Denmark.**
S.23785	+		28.1.54	Tallaght: 53°17'N. 6°23'W. (Dublin).
Paris	O	pull.	24.5.53	Berck: 50°24'N. 1°36'E. (Pas-de-Calais) **France.**
GA.260	×	(wires)	3.8.53	East Guldeford: 50°58'N. 0°46'E. (Sussex).
Leiden	O	pull.	12.7.48	Ameland: 53°28'N. 5°45'E. **West Frisian Is.**
218678	×		21.2.52	Wellington: 52°42'N. 2°30'W. (Shropshire).
Leiden	*	juv. ♂	19.11.48	Reeuwijk: 52°03'N. 4°42'E. **Zuid Holland.**
194755	×		8.4.54	Exmouth: 50°37'N. 3°24'W. (Devon).
Leiden	*	juv. ♂	20.11.48	as above **(Zuid Holland).**
194873	/?/		*ca.* 4.1.52	Biggleswade: 52°06'N. 0°16'W. (Bedford).
Leiden	*	ad. ♂	15.11.51	as above **(Zuid Holland).**
225050	×		0.2.54	Dawlish: 50°35'N. 3°27'W. (Devon).
Prague	O	pull.	2.6.54	Breclav: 48°48'N. 16°49'E. **Czecho-Slovakia.**
H.18503	+		20.9.54	Burton Marshes: 53°16'N. 3°02'W. (Cheshire).

Ringed Plover (*Charadrius hiaticula*)

Stavanger	*	♂	25.8.51	Revtangen: 58°45'N. 5°30'E. (Rogaland) **Norway.**
812584	+		21.8.54	Medway Estuary: *ca.* 51°25'N. 0°40'E. (Kent).

Golden Plover (*Charadrius apricarius*)

Reykjavik	O	pull.	28.6.47	Borgarfjördur: 64°38'N. 21°32'W. **Iceland.**
5/3716	+		0.10.53	Lough Mask: 53°37'N. 9°26'W. (Mayo).

ykjavik	O	pull.	23.7.50	as above **(Iceland).**
121	+		5.9.52	Lough Beg: 54°47′N. 6°29′W. (Antrim).
ykjavik	*	ad.	30.4.53	Midnes: 64°04′N. 22°43′W. **Iceland.**
594	+		8.1.54	Penzance: 50°06′N. 5°33′W. (Cornwall).
ykjavik	*	ad.	30.8.53	as above **(Iceland).**
651	+		9.10.53	Clonmines: 52°16′N. 6°46′W. (Wexford).
iden	*	ad.	29.9.51	Kollumerpomp: 53°18′N. 6°12′E. (Friesland) **Holland.**
359	+		29.1.52	Downham Market: 52°36′N. 0°24′E. (Norfolk).
iden	*	ad.	10.1.52	Appingedam: 53°20′N. 6°51′E. (Groningen) **Holland.**
890	×	(hawk)	4.12.52	Camber: 50°57′N. 0°44′W. (Sussex).
den	*	ad.	3.3.52	Wanswerd: 53°18′N. 5°52′E. (Friesland) **Holland.**
604	×		14.12.52	South Ronaldshay: 58°47′N. 2°58′W. (Orkney).

Turnstone (*Arenaria interpres*)

ykjavik	*		25.5.51	Midnes: 64°04′N. 22°43′W. **Iceland.**
932	+		17.3.53	Tory Island: 55°16′N. 8°14′W. (Donegal).
vanger	*		21.8.51	Revtangen: 58°45′N. 5°30′E. (Rogaland) **Norway.**
63	×		28.2.54	Dunwich: 52°16′N. 1°39′E. (Suffolk).

Snipe (*Capella gallinago*)

ykjavik	O	pull.	19.6.44	Lambavatn: 65°30′N. 24°07′W. **Iceland.**
654	+		0.2.48	Macroom: 51°54′N. 8°57′W. (Cork).
ykjavik	O	pull.	17.7.50	Kvisker: 63°59′N. 16°27′W. **Iceland.**
495	V		26.7.53	Omagh: 54°36′N. 7°19′W. (Tyrone).
penhagen	*		6.9.50	Copenhagen: 55°41′N. 12°35′E. **Denmark.**
312	+		30.1.53	Woodstock: 51°51′N. 1°22′W. (Oxford).

Woodcock (*Scolopax rusticola*)

ckholm	O	pull.	12.7.49	Rörbäcksnäs: 61°06′N. 12°50′E. (Kopparberg) **Sweden.**
12976	+		18.11.51	Kenmare: 51°53′N. 9°36′W. (Kerry).
ckholm	O	pull.	6.7.50	Värnamo: 57°11′N. 14°03′E. (Jönköping) **Sweden.**
12158	+		20.12.50	Downpatrick: 54°19′N. 5°43′W. (Down).
ckholm	O.	pull.	15.6.52	Ljusterö: 59°30′N. 18°35′E. (Stockholm) **Sweden.**
13503	+		12.10.52	Basingstoke: 51°16′N. 1°05′W. (Hampshire).
vanger	O.	pull.	24.5.52	Stokke: 59°14′N. 10°20′E. (Vestfold) **Norway.**
551	+		26.1.53	Swineford: 53°56′N. 8°57′W. (Mayo).

Curlew (*Numenius arquata*)

lsingfors	O	pull.	4.6.52	Sumiainen: 62°39′N. 26°03′E. **Finland.**
36051	+		6.9.52	Leven Estuary: 54°10′N. 2°50′W. (Westmorland).
lsingfors	O	pull.	27.6.52	Porvoo: 60°24′N. 25°40′E. **Finland.**
34611	+		11.10.52	Freiston Marsh: 53°00′N. 0°10′E. (Lincoln).
lsingfors	O	pull.	9.6.54	Island of Hailuoto: 65°00′N. 24°45′E. **Finland.**
42468	+		26.9.54	Dee Marshes: *ca.* 53°14′N. 3°00′W. (Cheshire).
lsingfors	O	pull.	21.6.54	Pori: 61°30′N. 21°47′E. **Finland.**
33414	+		25.9.54	Boston: 52°58′N. 0°01′W. (Lincoln).

Stockholm	O	pull.	29.5.50	Hedemora: 60°16′N. 15°59′E. **Sweden.**
TB 4768	×		8.12.52	Southwold: 52°19′N. 1°41′E. (Suffolk).
Stavanger	O	pull.	4.7.51	Time: 58°41′N. 5°41′E. (Rogaland) **Norway.**
33597	+		20.8.51	Read's Island, Humber: 53°42′N. 0°32′W. (Lincoln).
Helgoland	O	pull.	20.5.52	Bocholt: 51°50′N. 6°37′E. (Westphalia) **Germany.**
421605	+		3.9.52	Medway Estuary: *ca.* 51°25′N. 0°40′E. (Kent).
Leiden	O	pull.	9.5.52	Castricum: 52°33′N. 4°40′E. **Noord Holland.**
238527	+		15.11.52	River Crouch: *ca.* 51°37′N. 0°50′E. (Essex).

Whimbrel (*Numenius phaeopus*)

Reykjavik	O	pull.	13.7.46	Kollsvik: 65°37′N. 24°17′W. **Iceland.**
4/2291	+		6.5.53	Ross Island: 53°16′N. 9°37′W. (Galway).

Bar-tailed Godwit (*Limosa lapponica*)

Stavanger	*		11.9.49	Revtangen: 58°45′N. 5°30′E. (Rogaland) **Norway.**
79371	+		1950	Holy Island: 55°41′N. 1°47′W. (Northumberland).

Redshank (*Tringa totanus*)

Reykjavik	*	ad.	3.7.53	Midnes: 64°04′N. 22°43′W. **Iceland.**
5/3631	×		14.11.53	New Brighton: 53°26′N. 3°03′W. (Cheshire).
Copenhagen	O	juv.	8.6.53	Amager: 55°40′N. 12°38′E. (Zealand) **Denmark.**
783173	×		4.2.54	Lowestoft: 52°29′N. 1°46′E. (Suffolk).

Knot (*Calidris canutus*)

Reykjavik	*		25.5.51	Midnes: 64°04′N. 22°43′W. **Iceland.**
6/5908	×		13.2.53	Burton Marshes: 53°16′N. 3°02′W. (Cheshire).
Reykjavik	*		26.7.53	as above **(Iceland).**
84340	+		Autumn 1954	Wexford Harbour: 52°20′N. 6°28′W.
Reykjavik	*	ad.	8.9.53	as above **(Iceland).**
84376	+		5.1.54	Breydon Water: *ca.* 52°37′N. 1°42′E. (Norfolk).
Stavanger	*		12.9.46	Revtangen: 58°45′N. 5°30′E. (Rogaland) **Norway.**
76830	×		20.1.53	Flookburgh: 54°11′N. 2°59′W. (Lancashire).
Stavanger	*	ad.	11.8.48	as above **(Norway).**
62969	+		20.1.51	Gedney Marshes: 52°51′N. 0°09′E. (Lincoln).
Stavanger	*		11.8.48	as above **(Norway).**
62977	×		27.6.54	Medway Estuary: *ca.* 51°25′N. 0°40′E. (Kent).
Stavanger	*	ad.	3.9.49	as above **(Norway).**
12796	+		14.1.51	River Blackwater: 51°45′N. 0°50′E. (Essex).
Stavanger	*		3.9.49	as above **(Norway).**
13097	+		7.2.54	Mouth of Tees: *ca.* 54°37′N. 1°10′W. (Yorkshire).
Stavanger	*	ad.	17.9.49	as above **(Norway).**
79797	×		Winter 50/51	Grangemouth: 56°02′N. 3°45′W. (Stirling).
Stavanger	*	ad.	3.9.50	as above **(Norway).**
711531	+		10.1.51	Wells-next-the-Sea: 52°56′N. 0°50′E. (Norfolk).
Stavanger	*		21.8.51	as above **(Norway).**
9437	+		31.1.54	Walton-on-the-Naze: 51°51′N. 1°16′E. (Essex).
Stavanger	*		22.9.52	as above **(Norway).**
723332	+		30.1.54	Terrington Marsh: 52°48′N. 0°18′E. (Norfolk).

Dunlin (*Calidris alpina*)

ckholm	*	ad.	1.8.49	Ottenby: 56°13′N. 16°25′E. (Öland) **Sweden.**
6299	+		29.11.52	Clevedon: 51°26′N. 2°51′W. (Somerset).
ckholm "Ornis"	*	ad.	31.8.52	as above **(Sweden).**
879	+		10.12.52	Milford Haven: 51°42′N. 5°07′W. (Pembroke).
ckholm "Ornis"	*		2.9.53	as above **(Sweden).**
841	×		*ca.* 8.3.54	Bolton-le-Sands: 54°07′N. 2°48′W. (Lancashire).
eborg	*		1.8.52	as above **(Sweden).**
243	×		4.10.52	Canvey Island: 51°32′N. 0°35′E. (Essex).
vanger	*		1.9.49	Revtangen: 58°45′N. 5°30′E. (Rogaland) **Norway.**
55				
	+		20.2.51	Wrangle: 53°02′N. 0°08′E. (Lincoln).
vanger	*		5.9.50	as above **(Norway).**
914	×		29.1.54	Wrotham: 51°19′N. 0°19′E. (Kent).
vanger	*		27.8.51	as above **(Norway).**
977	+		20.1.53	Ribble Estuary: *ca.* 53°43′N. 2°50′W. (Lancashire).
vanger	*		9.9.51	as above **(Norway).**
807	+		30.1.54	Blakeney: 52°58′N. 1°01′E. (Norfolk).
vanger	*		24.8.52	as above **(Norway).**
192	×		13.9.52	Mouth of Tees: *ca.* 54°37′N. 1°10′W. (Durham).
vanger	*		21.9.52	as above **(Norway).**
685	+		24.1.53	Bo'ness: 56°01′N. 3°37′W. (West Lothian).
vanger	*		27.9.52	as above **(Norway).**
922	+		2.11.53	Breydon Water: *ca.* 52°37′N. 1°42′E. (Norfolk).
vanger	*		30.9.52	as above **(Norway).**
878	×		30.12.52	River Blackwater: 51°44′N. 0°46′E. (Essex).
vanger	*		26.9.53	as above **(Norway).**
629	+		23.10.53	Rockcliffe Marsh: 54°58′N. 3°03′W. (Cumberland).
vanger	*		30.9.53	as above **(Norway).**
713	×		0.12.53	Eastpark Marshes: 54°59′N. 3°27′W. (Dumfries).
vanger	*		5.10.53	Lista: 58°05′N. 6°37′E. (Vest-Agder) **Norway.**
313	×		0.2.54	Langstone Harbour: *ca.* 50°49′N. 1°00′W. (Hampshire).
enhagen	*	ad.	29.7.53	Ottenby: 56°13′N. 16°25′E. Öland, **Sweden.**
759	×		6.2.54	Margate: 51°23′N. 1°24′E. (Kent).
enhagen	*		11.9.53	Amager: 55°40′N. 12°38′E. (Zealand) **Denmark.**
673				
	×		22.2.54	Kempsford: 51°41′N. 1°46′W. (Gloucester).

Sanderling (*Crocethia alba*)

kjavik	*		22.5.53	Midnes: 64°04′N. 22°43′W. **Iceland.**
65	+		1.11.54	Gweebarra: 54°52′N. 8°25′W. (Donegal).
kjavik	*		4.6.53	as above **(Iceland).**
90	+		28.11.54	Coney Island: 54°18′N. 8°36′W. (Sligo).

Great Black-backed Gull (*Larus marinus*)

kjavik	O	pull.	15.7.52	Breidamerkursandur: *ca.* 64°00′N. 16°20′W. **Iceland.**
71				
	×		14.3.54	Strangford Lough: *ca.* 54°25′N. 5°35′W. (Down).
vanger	O	pull.	14.6.53	Hovden: 61°43′N. 4°53′E. (Sogne) **Norway.**
96	×		24.2.54	Scarborough: 54°17′N. 0°24′W. (Yorkshire).
vanger	O	pull.	22.6.53	Naeröy: 61°36′N. 5°04′E. (Sogne) **Norway.**
26	×		20.2.54	Harford Bridge: 52°36′N. 1°18′E. (Norfolk)

Stavanger	O	pull.	15.6.52	Rott: 58°55′N. 5°30′E. (Rogaland) **Norway.**
36116	×		18.10.53	Great Yarmouth: 52°36′N. 1°45′E. (Norfolk).
Stavanger	O	pull.	13.6.53	as above **(Norway).**
36015	×		0.2.54	Dovercourt: 51°56′N. 1°16′E. (Essex).
Stavanger	O	pull.	14.6.53	as above **(Norway).**
36637	×		1.3.54	Caister: 52°38′N. 1°45′E. (Norfolk).
Stavanger 34411	O	pull.	31.5.53	Orrevann: 58°44′N. 5°32′E. (Rogaland) **Norway.**
	×		11.2.54	South Pickenham: 52°36′N. 0°45′E. (Norfolk).
Göteborg D.40348	O	pull.	7.7.52	Guleskär: 58°25′N. 11°20′E. (Bohuslän) **Sweden.**
	×		9.2.54	King's Lynn: 52°45′N. 0°24′E. (Norfolk).

Lesser Black-backed Gull (*Larus fuscus*)

Stavanger	O	pull.	8.7.50	Fedje: 60°50′N. 4°43′E. (Hordaland) **Norway.**
33246	×		19.7.51	Sale: 53°26′N. 2°19′W. (Cheshire).
Göteborg D.41644	O	pull.	1.7.51	Kullavik: 57°31′N. 12°05′E. (Halland) **Sweden.**
	×		1.5.52	Grimsby: 53°34′N. 0°05′W. (Lincoln).

Herring Gull (*Larus argentatus*)

Moscow D.228289	O	pull.	27.7.51	Murmansk Coast: *ca.* 68°38′N. 38°00′E. **Russia.**
	×		20.5.54	Ripon: 54°08′N. 1°31′W. (Yorkshire).
Stavanger	O	pull.	15.6.52	Hovden: 61°43′N. 4°53′E. (Sogne) **Norway.**
46567	×		20.1.53	Southend: 51°32′N. 0°43′E. (Essex).
Copenhagen M.12205	O	pull.	9.7.52	Katholm: *ca.* 55°00′N. 9°45′E. (Alsen) **Denmark.**
	×		26.12.52	Cambridge: 51°44′N. 2°22′W. (Gloucester).
Helgoland	O	pull.	24.7.53	Langeroog: 53°45′N. 7°30′E. **E. Frisian Is.**
361577	×		0.1.54	Great Yarmouth: 52°36′N. 1°45′E. (Norfolk).

Common Gull (*Larus canus*)

The records of Common Gulls have followed the usual pattern, recoveries having been reported from their breeding-places in Finland, Scandinavia and northern Germany in considerable numbers.

Black-headed Gull (*Larus ridibundus*)

Large numbers of ringed Black-headed Gulls are reported in Britain each winter, the places of origin being chiefly the countries of northern Europe, with a not inconsiderable number from Czecho-Slovakia, Saxony and Bavaria.

Kittiwake (*Rissa tridactyla*)

Moscow E.167047	O	pull.	10.7.49	Murmansk Coast: *ca.* 68°38′N. 38°00′E. **Russia.**
	×		9.8.51	Aberlady: 56°01′N. 2°51′W. (East Lothian). *Bird long dead.*
Moscow	O	pull.	12.7.50	as above **(Russia).**
218706	×		0.4.51	Elie: 56°11′N. 2°49′W. (Fife).

Common Tern (*Sterna hirundo*)

Helgoland 7147800	O	pull.	8.7.49	Estuary of R. Oste: 53°50′N. 9°03′E. **Germany.**
	×		30.11.52	Sheringham: 52°57′N. 1°12′E. (Norfolk).

Although a late date, the body was described as "quite fresh".

goland	O	pull.	52 or 53	Scharhörn I.: 53°58′N. 8°25′E. **Germany.**
3697	×		10.8.53	Boston: 52°58′N. 0°01′W. (Lincoln).
goland	O	pull.	14.7.53	as above **(Germany).**
4086	×		2.9.53	Hartlepool: 54°43′N. 1°10′W. (Durham).
den	O	pull.	1.8.53	Den Helder: 52°58′N. 4°45′E. **Noord Holland.**
5803	×		15.9.53	Thames Haven: 51°31′N. 0°31′E. (Essex).

Arctic Tern (*Sterna macrura*)

ckholm	O	pull.	7.6.51	Hammersnäs: 55°29′N. 12°58′E. (Malmöhus) **Sweden.**
1544	×		5.8.51	Droitwich: 52°16′N. 2°09′W. (Worcester).

Long-eared Owl (*Asio otus*)

ien	O	pull.	3.7.53	Den Helder: 52°58′N. 4°45′E. **Noord Holland.**
506	×		14.4.54	Gravesend: 51°26′N. 0°22′E. (Kent).

Swift (*Apus apus*)

vanger	O	pull.	25.7.54	Siljan: 59°18′N. 9°42′E. (Telemark) **Norway.**
396	×		25.8.54	Rossington: 53°29′N. 1°04′W. (Yorkshire).

This is the only instance of a Swift bred in a foreign country being found the British Isles.

Hooded Crow (*Corvus cornix*)

o	*	ad.	15.10.41	Dombås: 62°05′N. 9°07′E. (Dovre) **Norway.**
92	+		18.2.48	Lockerbie: 57°07′N. 3°21′W. (Dumfries).
vanger	O	pull.	29.5.51	Stokke: 59°11′N. 10°19′E. (Vestfold) **Norway.**
01	+		9.10.51	Humber Area: *ca.* 53°30′N. 0°05′E. (Lincoln).

Rook (*Corvus frugilegus*)

den	O	pull.	4.5.49	Giethoorn: 52°45′N. 6°05′E. (Overijssel) **Holland.**
676	×		24.4.50	Cawood: 53°50′N. 1°08′W. (Yorkshire).
den	O	pull.	5.5.49	as above **(Holland).**
351	×		12.3.50	Leiston: 52°13′N. 1°35′E. (Suffolk).
den	O	pull.	5.5.49	as above **(Holland).**
370	×		0.2.50	Selby: 53°47′N. 1°04′W. (Yorkshire).
den	O	pull.	6.5.49	as above **(Holland).**
399	+		0.1.50	Bury-St.-Edmunds: 52°15′N. 0°44′E.(Suffolk).
den	O	pull.	10.5.49	as above **(Holland).**
696	/?/		2.3.50	Toddington: 51°57′N. 0°32′W. (Bedford).
den	O	pull.	5.5.50	as above **(Holland).**
317	+		13.4.51	Gaywood: 52°46′N. 0°26′E. (Norfolk).
den	O	pull.	6.5.50	as above **(Holland).**
536	/?/		14.1.51	Lexham: 52°44′N. 0°45′E. (Norfolk).
den	O	pull.	6.5.51	as above **(Holland).**
651	+		25.12.52	Great Gransden: 52°11′N. 0°09′W. (Huntingdon).
den	O	pull.	8.5.51	as above **(Holland).**
057	×		4.2.52	Fowlmere: 52°06′N. 0°04′E. (Cambridge).

Jackdaw (*Corvus monedula*)

ovgaard	O	pull.	11.6.50	Humlum: 52°32′N. 8°34′E. (Jutland) **Denmark.**
4587	+		15.4.51	Kilverstone: 52°26′N. 0°47′E. (Norfolk).

Fieldfare (*Turdus pilaris*)

Helsingfors	O	pull.	29.6.51	Kangasniemi: 62°02′N. 26°40′E. **Finland.**
A.35451	×		20.11.51	Driffield: 54°00′N. 0°25′W. (Yorkshire).
Stockholm	O	pull.	27.6.50	Sundsvall: 62°23′N. 17°21′E. (Västernorrland) **Sweden.**
Y.88044				
	×		0.3.51	Lastingham: 54°18′N. 0°53′W. (Yorkshire).
Stockholm	O	pull.	8.7.51	Undersåker: 63°18′N. 13°15′E. (Jämtland)
YA.6866				**Sweden.**
	×		4.3.52	Studley: 52°16′N. 1°53′W. (Warwick).
Stockholm	O	pull.	18.5.52	Frändefors: 58°29′N. 12°18′E. (Dalsland)
Y.98274				**Sweden.**
	V		30.12.52	Chilmark: 51°06′N. 2°03′W. (Wiltshire).
Stockholm	O	pull.	6.6.52	Öster Lövsta: 60°26′N. 17°48′E. (Uppland)
Y.90745				**Sweden.**
Oslo	×		15.11.52	Beechamwell: 52°38′N. 0°35′E. (Norfolk).
039743	O	pull.	7.6.49	Ål: 60°38′N. 8°35′E. (Hallingdal) **Norway.**
	×		*ca.* 23.1.52	Gateshead: 54°57′N. 1°36′W. (Durham).
Oslo	O	pull.	19.6.51	Hjerkinn: 62°14′N. 9°33′E. (Dovre) **Norway.**
055113	×		15.11.51	Co. Antrim.
Stavanger	O	pull.	16.6.51	Gjestal: 58°46′N. 5°51′E. (Rogaland)
710121				**Norway.**
	×		31.1.54	Menheniot: 50°26′N. 4°24′W. (Cornwall).

Song Thrush (*Turdus philomelos*)

Stockholm	O	pull.	18.6.51	Ström: 63°50′N. 15°40′E. (Jämtland)
Y.94988				**Sweden.**
	×		0.11.51	Leyburn: : 54°19′N. 1°49′W. (Yorkshire).
Göteborg	O	pull.	22.5.48	Dals-Ed: 58°54′N. 11°57′E. **Sweden.**
B.33532	×		8.5.52	Kemsing: 51°18′N. 0°14′E. (Kent).
Leiden	O	pull.	2.6.52	Reeuwijk: 52°03′N. 4°42′E. **Holland.**
D.101029	×		6.12.52	Worthing: 50°49′N. 0°23′W. (Sussex).

Redwing (*Turdus musicus*)

Reykjavik ...	O	pull.	16.6.53	Myvatn: 65°39′N. 16°58′W. **Iceland.**
74460	×		31.10.53	Stornoway: 58°13′N. 6°23′W. Isle of Lewis.
Stavanger	O	pull.	2.6.53	Oslo: 59°54′N. 10°46′E. **Norway.**
724819	×		6.2.54	Truro: 50°16′N. 5°03′W. (Cornwall).

Blackbird (*Turdus merula*)

Helsingfors	O	pull.	17.6.52	Helsingfors: 60°15′N. 24°57′E. **Finland.**
A.38841	×		20.2.53	Potter's Bar: 51°43′N. 0°11′W. (Middlesex).
Stockholm	O	pull.	25.5.50	Mjöbäck: 57°18′N. 12°53′E. (Älvsborg)
Y.56737				**Sweden.**
	×		0.1.53	Pwllheli: 52°54′N. 4°26′W. (Caernarvon).
Stockholm	O	pull.	30.5.51	Nynäshamn: 58°54′N. 17°55′E. (Södermanland) **Sweden.**
Y.81358				
	+		20.4.53	Newcastle Emlyn: 52°04′N. 4°28′W. (Carmarthen).
Stockholm	O	pull.	17.5.52	Hallsberg: 59°04′N. 15°09′E. (Örebro)
YB.1788				**Sweden.**
	/?/		16.10.52	Portnahaven: 55°41′N. 6°31′W. Isle of Islay.
Stavanger	*	ad.	23.3.52	Hauge: 58°20′N. 6°17′E. (Rogaland) **Norway.**
716769	×	(trap)	3.3.53	Greenlaw: 55°42′N. 2°28′W. (Berwick).
Stavanger	O	pull.	17.6.52	Follerö: 63°00′N. 8°44′E. (Surnadal) **Norway.**
817470	×		15.11.52	Sotterley: 52°24′N. 1°38′E. (Suffolk).
Stavanger	*	ad. ♀	22.10.52	Revtangen: 58°45′N. 5°30′E. (Rogaland)
717067				**Norway.**
	×	(trap)	2.5.53	Glen Otter: 54°55′N. 5°05′W. (Wigtown).

anger	*	ad.	24.10.52	Hauge: (Rogaland) **Norway.**
77	V		1.11.52	Gibraltar Point: 53°06′N. 0°21′E. (Lincoln).
gaard	O	pull.	20.6.51	Sondbjerg: 56°40′N. 8°34′E. (Jutland) **Denmark.**
,640				
	×		22.3.53	Blairgowrie: 56°36′N. 3°21′W. (Perth).
goland	*	ad. ♀	23.10.53	Heligoland: 54°11′N. 7°55′E. **Germany.**
369	×		0.2.54	West Somerton: 52°43′N. 1°40′E. (Norfolk).

Redstart (*Phoenicurus phoenicurus*)

olfzell	*	♀	2.9.53	Ottenby: 56°13′N. 16°25′E. (Öland) **Sweden.**
637	V		15.9.53	Sandwich: 51°16′N. 1°21′E. (Kent).

his ring was one of a consignment borrowed from another ringing station n emergency.

Spotted Flycatcher (*Muscicapa striata*)

s	*	ad.	24.9.50	St. Emilion: 44°54′N. 0°10′W. (Gironde) **France.**
6067				
	×		14.6.53	Bausley: 52°44′N. 3°00′W. (Montgomery).

No other Spotted Flycatcher with a foreign ring has been reported, and this is obviously a British breeding bird.

Grey Wagtail (*Motacilla cinerea*)

ssels	O	pull.	6.5.52	Brussels: 50°52′N. 4°22′E. **Belgium.**
704	×		13.3.53	Long Stratton: 52°29′N. 1°15′E. (Norfolk).

This is the first Grey Wagtail to be reported from abroad.

Starling (*Sturnus vulgaris*)

singfors	O	pull.	3.6.52	Nummi: 60°24′N. 23°53′E. **Finland.**
198	×		14.12.52	Downham Market: 52°36′N. 0°24′E. (Norfolk).
singfors	O	pull.	25.5.53	Espoo: 60°12′N. 24°39′E. **Finland.**
504	+		6.2.54	Layer de la Haye: 51°51′N. 0°52′E. (Essex).
singfors	O	pull.	25.5.53	Hämeenlinna: 61°12′N. 24°15′E. **Finland.**
207	×		0.1.54	Martham: 52°43′N. 1°38′E. (Norfolk).
singfors	O	pull.	28.5.54	Saaksmaki: 61°13′N. 24°10′E. **Finland.**
7862	×		8.11.54	Lightship "Newarp": 52°45′N. 2°00′E. North Sea.
cow	O	pull.	22.5.48	Rybinsk Area: 58°30′N. 37°30′E. **Russia.**
5235	×	(cat)	0.3.50	Colwinston: 51°28′N. 3°32′W. (Glamorgan).
cow	O	pull.	2.6.51	as above **(Russia).**
31086	×		2.2.54	Newport Pagnall: 52°05′N. 0°43′W. (Buckingham).
cow	O	pull.	30.5.52	as above **(Russia).**
32423	×		0.12.52	West Beckham: 52°55′N. 1°11′E. (Norfolk).
cow	O	pull.	8.5.53	as above **(Russia).**
9044	×		2.1.54	Toynton All Saints: 53°09′N. 0°06′E. (Lincoln).
cow	O	ad. ♂	25.5.53	Riga: 56°57′N. 24°09′E. **Latvia.**
53742	×		15.1.54	Llanboidy: 51°53′N. 4°36′W. (Carmarthan).
cow		no data		**Latvia.**
48982	×		9.5.54	Gorleston: 52°35′N. 1°44′E. (Norfolk). *Bird long dead.*
cow	O	pull.	23.5.52	Bialowieza: 52°40′N. 23°52′E. **Poland.**
118865	( )		10.1.53	Layham: 52°02′N. 0°57′E. (Suffolk).
cow	O	pull.	20.5.53	as above **(Poland).**
83330	×		23.2.54	Jersey, Channel Islands.

Polonia Varsovia	O	pull.	23.5.51	Olsztyn (ex-Allenstein): 53°46′N. 20°29′E. **Poland.**
F.152946	×		5.2.52	Newquay: 50°24′N. 5°54′W. (Cornwall).
Polonia Varsovia	O	pull.	26.5.52	as above **(Poland).**
F.160481	×		1.4.53	Dover: 51°07′N. 1°19′E. (Kent).
Polonia Varsovia	O	pull.	30.6.52	Oborniki: 52°38′N. 16°50′E. (Poznan) **Poland.**
F.159738	×		28.1.53	Cranleigh: 51°09′N. 0°29′W. (Surrey).

Starlings are recovered each winter from Holland, Scandinavia and Northern Germany, ringed both as adults and nestlings, and on account of their numbers have not been published for some time in these lists. Those detailed above give an indication of the most easterly and most distant areas from which come the winter-visitors to Britain.

Leiden	*	♀	29.10.51	Loosduinen: 52°04′N. 4°15′E. Holland, transported Basle: 47°34′N. 7°35′E. **Switzerland.**
E.4188	×		16.2.54	Builth Wells: 52°09′N. 3°24′W. (Brecon).
Leiden	*	♀	22.10.52	Loosduinen, transported Geneva: 46°12′N. 6°10′E. **Switzerland.**
K.14051	×		13.12.52	Sedgemoor: *ca.* 51°06′N. 2°50′W. (Somerset).
Leiden	*	♂	31.10.52	Loosduinen, transported Zürich: 47°22′N. 8°33′E. **Switzerland.**
K.14689	V		8.12.52	Sibford Ferris: 52°02′N. 1°29′W. (Oxford).

These birds have been intercepted in the course of their migration and transported to places from which Starlings do not normally come to the British Isles. Their original objectives seem to have been gained in spite of this.

Linnet (*Carduelis cannabina*)

Paris	*	ad.	30.10.53	St. Jean-le-Vieux: 43°09′N. 1°14′W. (Basses Pyrénées) **France.**
HP 6541	×		5.8.54	Sutton Courtenay: 51°39′N. 1°17′W. (Berkshire).

Chaffinch (*Fringilla coelebs*)

Leiden	*	juv. ♀	12.10.47	Loosduinen: 52°04′N. 4°15′E. **Holland.**
F.36879	×		28.4.52	Langham: 51°58′N. 0°58′E. (Essex).
Leiden	*	juv. ♀	13.10.51	as above **(Holland).**
H.2202	×	(cat)	0.12.52	Sallins: 53°15′N. 6°40′W. (Kildare).
Leiden	*	juv. ♀	8.10.53	as above **(Holland).**
H.12428	×		26.3.54	Botley: 50°56′N. 1°16′W. (Hampshire).
Leiden	*	♂	1.10.52	Baarle Nassau: 51°27′N. 4°57′E. (N. Brabant) **Holland.**
F.75354	×		24.3.54	Ightham: 51°18′N. 0°18′E. (Kent).
Leiden	*	♀	4.10.52	as above **(Holland).**
H.17039	×		1.2.54	Shannon Airport: 52°42′N. 8°58′W. (Clare).
Brussels	*	♀	19.3.49	Merxem: 51°14′N. 4°26′E. (Antwerp) **Belgium.**
18 A 918	×		25.3.51	Beaconsfield: 51°37′N. 0°38′W. (Buckingham).
Brussels	*		6.10.51	Kemmel: 50°47′N. 2°50′E. **West Flanders.**
3 B 2506	/?/		22.2.53	Salisbury: 51°04′N. 1°47′W. (Wiltshire).
Brussels	*		5.10.52	Brussels: 50°52′N. 4°22′E. **Belgium.**
3 B 6327	×	(cat)	30.11.52	Hayling Island: 50°48′N. 0°59′W. (Hampshire).
Brussels	*		6.10.52	Charleroi: 50°24′N. 4°28′E. (Hainaut) **Belgium.**
4 B 3960	/?/		27.1.53	St. John: 49°15′N. 2°08′W. Jersey.

NOTES

Little Ringed Plovers breeding in Nottinghamshire.—Two nests of Little Ringed Plover (*Charadrius dubius*), each containing a clutch of four eggs, were found at a gravel-pit in the Trent Valley in 1956; the first nest was discovered by A. Teather on 24th June, the second was confirmed by W. Priestley on 2nd July. The first clutch disappeared when near hatching; the second produced four chicks of which only one survived the very wet weather. Observations showed that two pairs were present. These are the first breeding records for the county.

A third pair took up territory at another gravel-pit some 30 miles away and were seen by W. Priestley to be making scrapes on 13th May. These birds were present throughout the summer and, although no young were observed, the adults' behaviour suggested their presence, especially during July. A. DOBBS

[As we have stated previously, we are publishing separate records of Little Ringed Plovers breeding only when a new county is involved and, although 1956 seems to have been a year of very successful consolidation in some parts of the country, Nottinghamshire is the only new colonisation of which we have heard. This year is the third since Mr. E. R. Parrinder's previous three-year summary of the spread of this species, and we are glad to be able to announce that he has agreed to prepare for us an analysis for 1954-56, which we hope to publish as early as possible in 1957.—EDS.]

Hoopoes breeding in Herefordshire.—Up to the end of 1954 the Hoopoe (*Upupa epops*) had been recorded in Herefordshire only 20 times and there had never been any report of nesting. In the summer of 1955, however, a pair bred in the grounds of a private house in the north-west of the county; the nest-hole was in a large oak at a height of some 35 feet. Although their calls had been heard previously, the birds were not identified until 29th May when one was seen by the daughter of the landowner, Miss H. S. Hutton, to flutter against a window of the house; later one or more of the birds were seen by Dr. C. W. Walker, Mr. L. Smith, Mr. P. W. Hinde and several other ornithologists including myself. The nest-hole was not found until 4th June and the young left it some four days later. The first occasion on which any of the young were seen after that was on 14th June when Mrs. Baker, who lives in the lodge near the nest-site, saw one accompanied by an adult. Subsequently she observed them many times, but no more than two birds were seen on any one occasion except on 30th July when there were four together. Two were seen feeding on elder-berries on 14th October and were last noted on the 31st of that month.

Fuller details may be found on pages 122-124 of the Herefordshire Ornithological Club Annual Report for 1955. R. H. BAILLIE

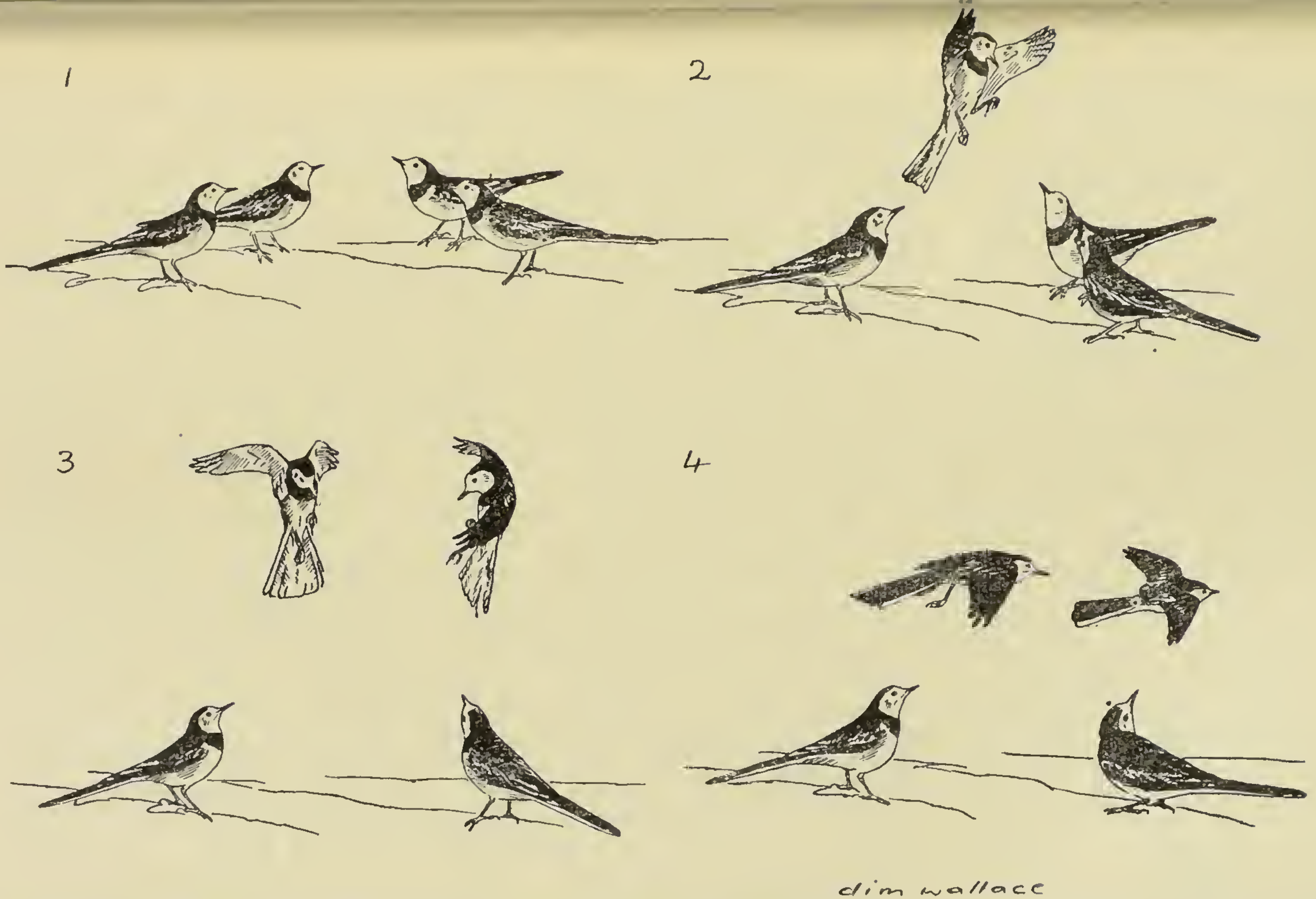
Hoopoes breeding in Hampshire. — In May 1956 a Hoopoe (*Upupa epops*) was seen in a garden at Middle Wallop, Hampshire. This bird was one of a pair that subsequently bred in a hole in the chalk wall of a barn there. By the beginning of the second week in July a young Hoopoe was frequently seen at the entrance to the nest, but it appeared to be missing on 11th July: on that day the parent birds were visiting the nest with food and remaining for some time there, but when they flew off it was seen that they were taking the food away with them again. On 13th July one young bird was found near-by in a pig-sty; it was put in a cage, which was then hung up by the nest where the parents continued feeding. On the next day, 14th July, the young Hoopoe was released, and from then one or more of the birds were seen almost every day for the next five weeks by various people but particularly Group-Captain G. F. Macpherson on whose lawn they used to feed. The last date on which any were noted was 21st August.

The above account has been built up partly from my own observations and partly from those of Group-Captain Macpherson, but much of the watching was done by various of the villagers; others present at different times included Miss E. S. McFie, and Messrs. W. H. Dowdeswell, G. G. Pierce and E. Williams.

During the nesting period one of the adult Hoopoes (presumably the male) spent much of its time collecting food on the lawns of two houses about half a mile from the nest, the main item being earthworms. The only birds to show aggression to this Hoopoe were Blackbirds (*Turdus merula*) which were seen on many occasions to threaten and sometimes attack it. J. H. TAVERNER

Communal display of Pied Wagtails. — While we were bird-watching at the Cambridge sewage farm at 15.30 hours on 8th October 1955, our attention was attracted to the behaviour of a flock of Pied Wagtails (*Motacilla alba yarrellii*). By careful approach we were able to close the distance between us and the birds to some ten yards. It was soon obvious that we were witnessing an extraordinary communal display. The following description is taken from notes and sketches made during and immediately after the observation:—

"A flock of eighteen Pied Wagtails had gathered together on some furrows of a sewage bed. It consisted of five adult males, two first-winter males and eleven others, either female or indeterminable. The birds were grouped roughly in an ellipse (Fig. 1), being all within an area of eight feet by two. They were indulging in a display which consisted of (1) *short hovering flights* by the first-winter and adult males, the birds rising to some nine inches above the group with flirting tails and heads pointed downwards (Figs. 2 and 3),—the brightest male hovered every time any other birds went up in the air—(2) *aerial chases* between the first-winter and adult males starting from and returning to the flock area, commencing both from the ground and from "hover-



Diagrammatic sketches of aerial display of Pied Wagtails (*Motacilla alba yarrellii*): Cambridge, October 1955
(*Drawn by* D. I. M. Wallace)

Fig. 1 shows a section of the flock, alert and watching each other. Figs. 2 and 3 show different stages in the "hover-flights" with the birds stationary in a vertical position with tails and heads pointed downwards. Fig. 4 shows the beginning of an aerial chase.

flights" (Fig. 4); and (3) some half-hearted attempts at *ground display* (wings and tail spreading) by the adult males. There was no obvious reaction from the females and other birds other than "interest" in the antics of the males. The whole display reminded D.I.M.W. of a lek of Black Grouse (*Lyrurus tetrix*)".

Though other Pied Wagtails were feeding near-by and odd birds did leave the group to catch an occasional fly, there was definitely no feeding in the area of display. We had at first thought that a source of easily-obtained food was the explanation of the gathering.

We can find no reference to like behaviour. There are previous notes on Pied Wagtail aerial displays named "bouncing" in this journal, (*antea,* vol. xli, pp. 306-307; and vol. xliv, pp. 62-63), but they bear little resemblance to our observation.

B. JEFFREY and D. I. M. WALLACE

Blackbird alighting on the sea.—On 8th November 1954, while watching from a ship about 15 miles east of Duncansby Head, Caithness, I saw small parties of Fieldfares (*Turdus pilaris*) and Blackbirds (*T. merula*) flying low over the sea from the north-east and on towards the Scottish mainland. On one occasion a female Blackbird was seen to mis-time a wave and settle somewhat heavily on the water where it remained floating with its wings partly spread and endeavouring to keep its head and tail clear, during the passage of several waves. Eventually it took off without any difficulty to join a party of Blackbirds passing overhead. Although both Blackbirds and Fieldfares were flying past very close to the ship, none attempted to land on it. D. F. BILLETT

Yellowhammer alighting on the sea.—On 10th June 1956, when I was watching birds on a narrow strip of beach at the foot of the cliffs at Glenthorne on the Devon/Somerset boundary, I saw a cock Yellowhammer (*Emberiza citrinella*) fly out from some bushes at the foot of the cliff. It circled for a moment above the sea and then landed on the water some twenty feet from the shore. For perhaps a quarter of a minute it swam quite buoyantly, though somewhat "down by the stern", on the slightly choppy sea; it then began to flap its wings, as though in an effort to rise. Meanwhile the incoming tide had carried it to within a few feet of the shore and it had become involved in small breakers. One of these it survived, crashing through the top of it to emerge soaked and still struggling, but was then unfortunately overwhelmed only a couple of feet from the shore and disappeared from view, so that I was unable to recover the corpse.

I can suggest no reason for this apparently suicidal behaviour, unless the bird was either bathing in an unusual way, or else had tried to alight on a piece of flotsam or floating seaweed, though I was unable to see any in its vicinity. D. K. BALLANCE

[The above accounts are of interest in connection with previously published observations on Passerines alighting on the sea (*antea,* vol. xlviii, pp. 419-420; vol. xlix, p. 153.—EDS.]

REVIEWS

SWIFTS IN A TOWER. By David Lack (*Methuen,* London, 1956). 239 pages; 10 half-tone plates; 24 text illustrations. 21s.

Not the least striking feature of that astonishing building, the University Museum of Science at Oxford, is the tower; for behind the ventilator shafts which puncture its roof Swifts have nested for many years. Here, as is now well known, Dr. David Lack and his wife have carried out a ten-year study of this little-known bird, and many ornithologists have clambered up into the tower to peer for themselves into the glass-backed nesting-boxes placed behind the shafts. The "basic idea for the experiment at Oxford" came from a visit to the Swiss ornithologist Weitnauer, who persuaded Swifts to nest in boxes under the eaves of his house. In 1952 Dr. Lack published in *British Birds* (vol. xlv, pp. 186-218) a long paper on his work, and this has been expanded slightly, and brought up to 1955, to form the core of the present exciting book (the scope of which is far wider than is suggested by the title). The clear lucid style of the earlier paper is retained, and the text is deliberately non-technical. It is constantly enlivened by amusing asides: like the description of the Swift which "stood up over its eggs each time that it heard the loud clapping of the crowd in the near-by Parks as successive New Zealand wickets fell to a triumphant University (which was the only team to beat the tourists in that year)". Here, as in his *The Life of the Robin,* the author demonstrates that it is possible to write a scientific book without a text overburdened with tables and graphs. The first table does not in fact appear until page 185, and before that there have been only two graphs. There are, however, a few places where one cannot help feeling that a diagram or table might have clarified the narrative description. But these are minor blemishes in a major work.

To the casual observer the life of the Swift falls into two parts: the aerial existence, remote and wild, exciting to watch but difficult to study; and the hidden life within the nest. The book falls neatly into similar parts. In the first half our attention is concentrated on the happenings within the nest-boxes; yet we are not cut off from the outside world as were the actual watchers in the tower, whose only contact was "the clock of Keble College over the way, always a little slow and a little out of tune". Constantly we are given comparisons with other races and species of swifts, with unrelated species of birds, and even with mammals, as we are led through the stages of life within the nest—with courtship and mating, building the nest, laying and incubation, the care and development of the nestling, until the young finally leave.

Each occupied box was defended by the pair against all comers —by threat postures at first, and then if necessary by strange fierce fights lasting 5 hours or more: "gladiatorial show(s) conducted only a few inches from our eyes". The loser often appeared in agony and completely exhausted, but no serious harm usually followed. Although mating often takes place in the nest, aerial mating, first described by Gilbert White, is confirmed by both Lack and Weitnauer. In Chapter 5, after a quiet description of Oxford nests, we are suddenly whisked away, as on a magic carpet, on a breathless journey from Lapland to the Pacific Islands, from the Himalayas to tropical America; a survey which "shows the diversity of adaption in the nesting of swifts, our own species in holes in cliffs, the spine-tails diving into hollow trees and breaking off twigs in flight, the swiftlets seeking dark caves and making the whole nest of saliva, black swifts dashing through waterfalls, American palm swifts flying up into palm spathes, scissor-tailed swifts building their own two-foot tube of felted feathers, Old World palm swifts gluing the eggs to a small shelf of feathers and clinging vertically to brood them, and crested swifts making a tiny egg cup on the side of a branch across which they sit". The young remain in the nest for between five and eight weeks, and their knowledge of the world is limited to that gained by looking out of the entrance hole during the last few days in the nest. After much hesitation the young Swift at last launches itself into the air. It never returns to the nest—and may, indeed, begin its migration to Africa the same day.

This section of the book is illustrated by a most remarkable series of photographs taken inside the tower by H. N. Southern, using electronic flash.

The remainder of the book deals with the wider life of the Swift: with flight, weather movements and migration (and an interlude on hibernation); with birth, survival and death; with roosting—on the nest, on walls in clusters "like swarms of bees", and on the wing; with predators and parasites. There is also an important discussion and re-classification of the races of *Apus apus*.

A discussion on the meaning of adaptation, inspired less perhaps by the Swifts in the tower than by the fact that Wilberforce and Huxley disputed on natural selection in a room under the tower, ends the book. Dr. Lack concludes: "This is a grave matter with which to end a bird-book, but the tower where our swifts live was built by those who held that the study of nature should lead us, through a truer understanding, to a fuller worship of the Creator, and the times urgently require us to search out the basis of our lives".

R. A. O. HICKLING

LIVING WITH BIRDS. By LEN HOWARD. (Collins, London, 1956.) 256 pages; 24 photographic plates; 10 text drawings. 15s.

FEW, very few people indeed have the ability to win the confidence of wild animals, and of those with this gift perhaps none has attracted so much attention as Miss Howard. Her earlier *Birds as Individuals* described the lives and personalities of some of the birds living in her garden and cottage; *Living with Birds* follows this same intriguing story, but is chiefly notable for the exploits of one very particular female Great Tit called Star, who seemingly learned to count.

"One morning", writes Miss Howard, "the 6th January, the idea struck me of trying her [Star] with a counting experiment. When, as usual, she flew to my hand for her nut, instead of giving it to her I held it up in my other hand and said, 'You must tap for it'. Looking at her intently I called in sharp accents, 'TAP, TAP'. While I spoke her eyes were fixed keenly on mine, then she immediately flew to the top of a wooden screen-frame . . . and deliberately rapped out two taps on the wood with her beak . . . she then flew to my hand for the nut". The next morning Star responded correctly to the verbal order "Tap, tap, tap", and this was repeated successfully four times that day. By the fourth day Star responded correctly when told to tap four times, the instructions now being given by tapping a pencil sharply on a table, instead of verbally. Only ten days after the first experiment Miss Howard "tapped five, which she copied correctly, then I tried six and she instantly got this. . . . Later in the day I gave her six again. This time she tapped five and then started to fly to my hand for her nut, but as if realising her mistake, turned back to the screen and gave one loud rap". That winter and in the following one Star learned to respond to numbers up to eight, but never got nine. On p. 21 we are told that Star "never gave a wrong number in response, but sometimes she was not in the mood to tap at all"; but on p. 74 that ". . . her mistakes were few; all are recorded here as well as her correct responses".

Hitherto Star's instructions had been given by tapping the required number with a pencil; but in October of the third winter Miss Howard began training her to respond to spoken numbers, e.g. "Three", not "Tap, tap, tap". Astonishingly, after only one or two lessons when the instructions were given both verbally and by tapping, Star responded correctly, though hesitatingly, to verbal instructions alone to tap three and four. Eight was again the highest number that she got right in this way. Star disappeared the next spring in her ninth year.

A feature of Star's tapping the higher numbers was that she often spontaneously varied the rhythm: thus when given six verbally, "she first gave this in the 2, 2, 2 division then, after a moment's pause . . . she slowly tapped 1, 3, 2. When doing triple divisions her pace was always slower . . . Later she did eight to my spoken word in 4, 4, then in 4, 3, 1, looking up at me with her pleased expression".

It is proper to ask whether Star could have been aided by Miss Howard's own, albeit quite unconscious, behaviour during the experiments. Miss Howard is aware of at least some of the difficulties in the way of interpreting Star's actions; but it is unfortunately still just possible that Star's unquestionably exceptional ability was not quite of the same order as that with which she is credited. Star may have hoodwinked Miss Howard in much the same way that "Clever Hans" hoodwinked his master. "Clever Hans" was a horse for whom it was claimed that he could do advanced mental arithmatic; but it was eventually shown that in fact he responded to involuntary changes in his master's expression. Although Star sometimes performed with her back to Miss Howard, she could have received some other, possibly auditory, communication: for instance, Miss Howard may unconsciously have held her breath until Star tapped the right number.

Star alone among Miss Howard's birds learned to tap to order, so there may never be an opportunity to repeat the experiments more convincingly. But whether or not Star was really counting, it is still quite remarkable that a wild bird can yet be persuaded to take part in such experiments. All credit is due to Miss Howard. It is a pity that we learn next to nothing about her knack of dealing with birds in the chapter on taming and attracting them—which only confirms its elusive quality.

After the feast of observations on Great Tits, the remaining chapters seem a trifle thin and of rather uneven quality; though the two on Blackbirds are better stuff again and full of close observation. But it is all fascinating, if sometimes tantalizing, reading.

Whilst much of Miss Howard's observation is valuable, sometimes unique, many of her interpretations need to be taken with a pinch of salt. Miss Howard is in a far better position than most of us to understand and interpret bird-behaviour, but she has two major faults—both perhaps springing from her very proximity to her birds: she is anthropomorphic to a degree that must make many readers wince; and she becomes so obsessed with her birds as individuals that she fails to see them as species, even to the extent of writing apropos of bird behaviour that "generalisations are impossible". Even the best generalisation has its exceptions and, after all, it is still the exceptions that prove the rule. Is it too much to hope that one day Miss Howard may also write the rules? She may be assured of close attention if she does. J.A.G.

ROCKALL. By JAMES FISHER. (*Bles*, London, 1956.) 200 pages; 17 photographic plates; maps and sketches. 18s.

THIS well-written monograph on a remote rock (only about 90ft. diameter at base and 63ft. high—alas, even in this monograph accurate superficial measurements are not given) is an achievement which must break yet another bibliographical record. It describes all the known landings on and scientific visits to this tiny islet, including the latest, by helicopter, by the wish of H.M. the Queen. James Fisher was fortunate to share this privilege with the annexation team from H.M.S. *Vidal*, on 18th September 1955—too late in the year to determine a main issue in the literature of Rockall, as to whether or not any sea bird, the Guillemot especially, attempts to nest on the storm-swept rock. There is presumptive evidence for the breeding of the Guillemot, but as yet no sound proof that any bird has laid an egg on Rockall.

In a twelve-page appendix the birds of Rockall and its 100 miles long fishing-bank are described systematically, from records made on 42 days by various observers between 11th March and 23rd September (there are no winter records). Gannet, Guillemot, Puffin and Kittiwake use the rock as a resting-place at intervals during the summer. Petrels are a main interest on the Rockall Bank. The Tristan Great Shearwater is most abundant in May and June (rafts of up to 500); the Sooty from midsummer onwards to September; and the Manx Shearwater numerous all summer. The dominant bird of course is the Fulmar, and Mr. Fisher points out once more (*vide* his monograph on *The Fulmar*) that no ornithologist watching the vast flocks of Fulmars on the Rockall Bank feeding on the fish-offal discarded by trawlers can fail to realise their dependence on these fishing-boats, and that their great southward increase, coincident with the development of modern trawling, is almost certainly associated with this abundant food-supply. R.M.L.

THE TECHNIQUE OF BIRD PHOTOGRAPHY. By JOHN WARHAM. (*Focal Press*, London, 1956.) 199 pages, including 48 of half-tone plates; many text figs. 25s.

BIRD PHOTOGRAPHY continues to attract many followers, and for those beginning the pursuit Mr. Warham has written a sound and efficient book on the apparatus and methods used today. For this purpose he is well-equiped, for, following a long experience in Britain, he has for the last five years been working in the comparatively virgin ground of Australia.

Much has been written on this subject, and it is therefore difficult to say anything very new or original, as the technique of the pursuit does not change rapidly. Mr. Warham, however, has given sound advice about the use of the modern electronic flash, and has some interesting remarks to make about the special problems involved in working in the tropics.

In general, his advice will be corroborated by the bird-photographers of experience, and the beginner will find much to help him on his way. G.K.Y.

ZOOLOGICAL PHOTOGRAPHY IN PRACTICE. By HUGH B. COTT (*Fountain Press*, London, 1956). 370 pages; 68 plates. 52s. 6d.

THE growing popularity of nature photography has exposed a need for instructional books on the technique of the subject, and in the last decade a number have been published to fill this gap. The latest is Dr. Cott's admirable treatise. For this task he is admirably qualified. A naturalist of distinction and a zoologist by training, he is also a photographer with a learned knowledge of his medium, and with an eye for both the scientific and aesthetic aspects of his results. This combination is rare, and gives special authority to his advice and conclusions. Moreover, his interests cover the whole field of nature, and he has had a wider experience than most of working away from home, in difficult circumstances, in lands as widely separated as East Africa and South America.

While his book discusses, of necessity, such matters as the choice of camera and other apparatus and accessories, it differs from most in almost ignoring such subjects as hides and their introduction to the quarry, and concentrates in detail on the photographic problems which are of special significance to the nature photographer. His chapter on the critical problem of focusing and depth of field admirably summarizes a matter which is the plague of every nature photographer's life, and in analysing the principles of pictorial design (which so many scientific photographers consider unimportant, but which Dr. Cott so rightly considers vital) he explains clearly how a little thought will turn a picture of merely scientific interest into a work of art.

Dr. Cott deals in great detail with the theory and practice of exposure, with negative material and its development, and with the making of prints and slides. This part of the book is perhaps over-weighted, for these matters are fundamental to *all* photography and do not greatly differ whether the subject be an animal, a lump of cheese, a portrait or a landscape. Dr. Cott has, however, reviewed these with special reference to the nature photographer, his needs and his problems. The book has one serious omission—the almost complete lack of reference to flash photography, which today has become a very important part of the technique of the nature photographer, and which has its own problems and difficulties.

Dr. Cott is particularly good on the subject of working in difficult surroundings. He has much to say on photography in the humid rain-forest and in the desert which lies right outside the experience of the majority. Many photographers who are by training very particular about temperature control, filtered water, etc., etc., will shudder to read of the conditions in which Dr. Cott has been forced to work—with what success the many admirable plates reveal.

In sum, this is an admirable book for the serious nature photographer, and with the advice given the present reviewer would not quarrel in one single instance. Especially would he agree with Dr. Cott's conclusions on the all-important matter of camera-choice, that if one wants to take *real* nature photographs, a large negative, and therefore a large camera, are a necessity.

G.K.Y.

LETTERS

THE REACTIONS OF MAN AND BIRD TO A SCORPION

Sirs,—In his letter on "The effects of model scorpion and lizard on a bird table" (*antea,* vol. xlviii, pp. 556-557), Col. R. Meinertzhagen suggested that the fear-reactions of the birds in his garden were more "intelligent" when presented with a model scorpion than the action of a man who picked up a real one. I think that what Col. Meinertzhagen's story does illustrate is the way in which a more "intelligent" nervous system can produce a less efficient action than a less highly developed one.

Of course, there are a great many aspects of body structure and function where very useful and important comparisons can be made between man and lower animals, including birds. No doubt the underlying principles of behaviour are often the same in men and birds, although in most instances proof is still lacking. It may be that the most important function of animal behaviour studies lies in the possibility that the results will form a good comparative foundation for a much improved human medical psychology.

The great danger of anthropomorphism is that one can so easily make erroneous comparisons between human behaviour modified as it is by various little-understood higher brain functions, and the much simpler reactions of a bird. The simpler and less variable reactions are so much easier to study.

The example that Col. Meinertzhagen gives of a man who was stung by a scorpion is an illustration of this. The man thought, and the emphasis is on the word "thought", that he was picking up a wing-less locust. If he had an inborn fear-reaction, which is very probable, he modified his response by thought and was injured.

Because the man is capable of higher mental processes and thereby modifies his instinctive protective reactions, it does not mean that his action is less "intelligent" than that of a bird which can very rarely modify its reactions. It is, however, a less efficient protection in this instance.

We may not be able to explain how or when the various species of bird that Col. Meinertzhagen mentions acquired their inborn fear of a scorpion, but it is surely very difficult to believe that it was anything other than an inborn fear. The mere fact that the man thought about it at all shows that evidently without previous experience of a scorpion, he had acquired what he believed was some knowledge of the animal he saw. That knowledge would almost certainly have been acquired through the power of speech, either written or spoken. Obviously the fear reactions of the birds and the misplaced confidence of the man must have been worked through very different mechanisms within the nervous system.

C. J. F. Coombs

A RAVEN ROOST IN DEVON

Sirs,—I was surprised to read in Mr. H. G. Hurrell's interesting account of a Devon Raven roost (*antea*, p. 28) that "At least one large roost of Ravens (*Corvus corax*) has been reported in Scotland . . . .". This is a considerable understatement of Scottish conditions, for since Macgillivray's account of a roost on Pabbay, Sound of Harris, published in 1837 (*History of British Birds*, Vol. I, p. 505), the habit has been remarked upon from time to time and recorded in the literature. Mention is made in *The Birds of Scotland* (Vol. I, pp. 3-4) of recorded roosts in Shetland, Sutherland, Wigtownshire, Kirkcudbright, Perthshire and Outer Hebrides, including A. B. Duncan's count of 276 Ravens at a North Uist roost. Reference to communal roosting in Scotland is not confined to volumes dealing primarily with Scottish ornithology; *The Handbook* (Vol. I, p. 8), referring to the numbers that may occur at roosts, gives "over 100 apparently normal in O. Hebrides".

At the present day the Raven continues to be abundant throughout the Outer Hebrides, with the population considerably augmented during autumn and winter. Here, at any rate, where the population is high, gregarious roosting is certainly not abnormal. James W. Campbell

NUTHATCH ROOSTING TIMES

Sirs,—I have read with much interest the letter from Mr. P. W. P. Browne (*antea*, vol. xlviii, pp. 562-564) about my paper "Nuthatch roosting times in relation to light as measured with a photometer" (*antea*, vol. xlviii, pp. 71-74). His statistical results are, I am afraid, rather beyond me though I am sure they are correct. That there is a general relationship between the hour of sunset and the hour of roosting is, I think, obvious. The thesis I was putting forward, however, and which I think is unaffected by Mr. Brown's arguments, is that the bird's actual moment of roosting was not affected by the light, and for that purpose a photometer reading at the moment of roosting was the only reading of value. To quote from my paper: "For instance, in January she roosted at 4.5 p.m. on the 4th, 7th, 15th and 20th and the light readings were respectively 13.0, 11.0, 1.5, 36.0 and 3.2 . . . . In February she roosted at 4.15 p.m. on 3rd, 4th and 19th with a light reading of 100.0 on the 3rd and 4th and less than 0.5 on the 19th". I therefore still think that the bird's hour of roosting does not depend primarily on the light. She may go to roost when she has had all the food she needs for the day or, to use an anthropomorphic phrase, when she has had enough exercise and "feels like bed". M. C. Radford

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15 JAN 1957

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BRITISH BIRDS

MOVEMENTS OF HOUSE SPARROWS

By D. Summers-Smith

The migration of birds—the routes they take, the means by which they orient themselves and reach their destination—is at present receiving considerable attention. The House Sparrow (*Passer domesticus*) is generally considered to be a sedentary bird and thus it is not a species that gets much mention in papers dealing with migration. However, since migration is such a widespread phenomenon in the Palaearctic region, sedentariness itself takes on a new interest. In the first part of this paper the available evidence is considered to establish how far the House Sparrow is sedentary and to what extent wanderings and seasonal movements occur.

In the second part of the paper the remarkable increases that have occurred in the range of the House Sparrow, both the natural extension eastwards across the Palaearctic region and the dramatic colonizations that have taken place in America, Australia and South Africa are reviewed and discussed in the light of the evidence on movements presented in Part I.

In a third section some implications of sedentariness are considered with particular reference to the evolution of geographical variations. Reasons for sedentariness in the House Sparrow and its advantages are suggested.

Thanks are due to the Bird-Ringing Committee of the British Trust for Ornithology for permission to quote from their records.

Part I—Movements and Migrations

The following types of movements may be considered: migration, feeding and roosting movements, dispersal and wandering. Migration is a seasonal alternation between a breeding-area and a wintering-area. In Europe the general pattern of migration is a southward or westward movement after the breeding-season and a return to the breeding-area in the spring. Feeding and roosting movements are generally based on a 24-hour period (or on tidal movements in the case of shore birds) and are frequently associated with each other. The distances involved are normally much shorter than in migration. Dispersal is considered as a random movement away from the breeding area, with wandering a continuation of such movement into the winter, the birds showing no definite attachment to a particular area but rather moving from one feeding ground to another; weather movements are of this type.

Data on House Sparrow movements are obtained from a number of sources. Firstly from recoveries of ringed birds and secondly from observations on colour-ringed individuals. These give information on actual movements undertaken by individual birds. More general information is obtained from observations of birds at coastal areas, occurrences of House Sparrows at stations where they do not breed, and observations on roosting. Finally, the results of some homing experiments are examined. While movement after transplanting cannot be considered as natural, nevertheless experiments of this sort should give some indication of the amount of movement normally undertaken by the bird. We should expect that a migratory species would exhibit a much greater capacity for homing than a sedentary one. The evidence is now considered under these headings.

RECOVERY OF RINGED BIRDS

The House Sparrow is among the species most frequently trapped and, although many bird ringers do not "waste" rings on it because of the lack of interesting recoveries that have been obtained, probably more than 100,000 individuals have been ringed in western Europe since the beginning of bird-ringing. Large numbers of the House Sparrows now established in North America have also been ringed.

Details of birds ringed in western Europe and recovered more than 5 miles away from the place of ringing are collected in Table I. A few records may have been overlooked, but it is unlikely that they would significantly affect the conclusions to be drawn. The majority of records refer to birds ringed as juveniles or to birds in their first year—adults are seldom trapped except when feeding young and thus Nos. 9-17 and 24-33 in the Table probably refer to birds ringed in their first year of life.

Several interesting points emerge from the Table. The maximum distance is only about 200 miles and there are only eighteen records of birds having travelled more than 20 miles. There is no significant directional movement for the birds ringed in summer and autumn and recovered in winter. This together with the distances travelled suggests a dispersal rather than a true migration. However, there is a little evidence of a slight northwards movement on the east coast of England in spring. There are four

BLE I—RECOVERIES OF RINGED HOUSE SPARROWS (*Passer domesticus*) IN WESTERN EUROPE

Ringing data			*Recovery data*		*Reference*
Date	*Age/sex*	*Place*	*Date*	*Distance/ direction*	
7.6.53	F.G.	Kent	12.11.53	8m. N.W.	B.T.O. records
17.6.53	J. ♀	E. Ross	20.9.54	6m. S.W.	,, ,,
20.6.46	J.	Anglesey	–.3.47	21m. N.E.	,, ,,
23.6.54	Pull.	Essex	18.3.55	30m. S.W.	,, ,,
26.6.55	J.	Surrey	–.12.55	9m. N.N.W.	,, ,,
11.7.54	♀	Dublin	12.11.54	10m. N.W.	,, ,,
27.7.55	J.	Lincs.	31.5.56	7m. E.	,, ,,
8.8.50	? J.	Yorkshire	20.5.52	8m. S.W.	,, ,,
14.8.52	F.G.	Cheshire	26.4.53	15m. N.E.	,, ,,
18.12.37	♂	Oxford	–.4.40	9m. S.W.	,, ,,
30.12.55	♀	Yorkshire	10.3.56	16m. W.N.W.	,, ,,
30.12.55	♂	Yorkshire	9.7.56	14m. N.W.	,, ,,
2.1.51	♀	Yorkshire	7.2.50	10m. N.W.	,, ,,
4.3.56	♂	Yorkshire	23.3.56	27m. N.N.W.	,, ,,
7.3.50	♂	Yorkshire	–.3.53	8m. S.	,, ,,
22.3.52	F.G.	Lancs.	12.1.56	11m. N.W.	,, ,,
25.3.52	♂	Warwicks.	5.4.52	5m. N.W.	,, ,,
—	Pull.	Poland	–.11.—	50m.	Perry, 1951
—	Pull.	Poland	–.3.—	112m.	,, ,,
3.6.48	J.	Norway	18.6.49	38m. N.E.	Olstad, 1953
24.6.36	Pull.	E. Germany	3.7.36	25m. S.W.	Jitschin, 1938
30.7.36	J.♀	W. Germany	5.11.36	25m. N.E.	Rademacher, 1938
7.8.37	J.	Heligoland	10.6.38	60m. N.E.	Drost, 1938
13.8.35	♂	E. Germany	17.1.36	93m. W.S.W.	Hansch, 1938
2.9.53	J.	Camargue	29.1.54	20m. S.E.	Hoffmann, 1955
24.9.37	♀	Lithuania	7.2.38	66m. S.S.W.	Posingis, 1938
29.10.36	–	Lithuania	8.1.37	12m. N.E.	,, ,,
27.11.53	♂	Camargue	28.4.54	185m. N.E.	Hoffmann, 1955
30.11.53	♂	Camargue	12.12.54	35m. N.W.	,, ,,
20.12.53	♂	Camargue	9.1.55	185m. N.E.	,, 1956
30.12.53	♂	Camargue	12.12.54	40m. N.W.	,, 1955
21.1.36	♂	Lithuania	15.11.36	41m. S.W.	Dumkow, 1938
14.2.35	♂	Heligoland	12.8.35	35m. E.N.E.	Drost, 1936

bbreviations : F.G. = Full-grown ; J. = Juvenile ; Pull. = Nestling ; m. = miles.

Yorkshire records of 10 to 27 miles and two Lincolnshire coastal records, though these are only of three miles.

The significance of the recoveries in Table I can only be assessed when they are viewed in relation to the total number of recoveries. These are shown for British and Continental birds (records from Germany, Holland and Poland) in Table II grouped into three categories: where ringed (i.e. less than 1 mile movement), 1-5 miles and more than 5 miles from place of ringing.

The results are probably slightly weighted in favour of recoveries at less than one mile from the place of ringing in view of the fact that ringing activities become well-known and neighbours begin to look for rings. It can be seen that, while the majority of individuals are remarkably stable, there is a small but real movement of birds over distances greater than five miles. There is apparently a greater tendency for movement among western European birds as shown by the greater distances of recoveries in Table I, the difference between the two populations in Table II is not, however, significant. In any case the maximum distance involved is very small.

TABLE II—DISTRIBUTION OF RECOVERIES OF RINGED HOUSE SPARROWS (*Passer domesticus*)

Region	*Distance of recovery*			*Total recoveries*	*Reference*
	1 *mile*	1-5 *miles*	5+ *miles*		
British Isles	396 (90.8%)	27 (6.2%)	13 (3.0%)	436*	B.T.O. records.
W. Europe	203 (89%)	14 (6.2%)	11 (4.8%)	228	Rademacher, 1952

* records to end February 1956.

OBSERVATIONS ON MIGRATION

Great Britain.

It has long been considered that some migration of House Sparrows occurs on the east coast of England, particularly in East Anglia and Kent but also to some extent in Yorkshire and Lincolnshire. For instance Dixon (1892) considered there was an immigration from the Continent from July to December (with a maximum in November) and a return from February to May (maximum March-April). Nelson (1907), writing on the birds of Yorkshire, stated that there was abundant evidence that considerable numbers crossed the North Sea in both autumn and spring. He cites a number of examples of "large flocks of clean looking birds which are undoubtedly migratory" at both Teesmouth and Spurn. He gives examples of "rushes" at Spurn during 14th-19th October 1884, 3rd-7th and 18-23rd October 1886, and 2nd-6th November 1895. Coward (1926) also considered there was migration on the east coast: "I am convinced that the large flocks of House Sparrows which I saw in early October on the Yorkshire coast were on passage; the size of the flocks varied from day to day, and a few days later abnormal numbers were noticed in East Anglia". Other writers have quoted similar experiences.

More recently House Sparrows have been seen coming from over the sea together with Tree Sparrows (*P. montanus*) at Gibraltar Point in Lincolnshire. In 1949 autumn passage was seen there on 13 days in September and October with peaks of 100-200; in 1950 passage was seen on 14 days between 8th and 31st October with *ca.* 150 birds on 8th October and up to 60 on two other days. There are similar reports for other years (see *Gibraltar Point Bird Observatory Annual Reports*, 1949-1954).

Further south, at the South Foreland in Kent in the late autumn of 1952, Lack (1954) observed a "definite southward passage of House Sparrows, the maximum being 200 in two hours on 26th October. The birds gave every appearance of being genuine migrants".

On the west coast, R. J. Raines (*in litt.*) is of the opinion that there is a slight movement, south and west, in Lancashire in the autumn. This is less well supported than the east coast movement; for example, there is no evidence of passage on the off-shore Welsh islands, where it would certainly not have gone unnoticed.

There is one record of a flock of about 100 on 5th October 1952 over the sea off Sark (W. D. Hooke, *in litt.*). And Gordon and Gordon (1930) saw a large flock on Tresco, Scilly Islands, on 17th March 1929, which they considered were migrant birds.

Enquiries to the Bird Observatories at Seahouses and Fair Isle have revealed no movement of House Sparrows at these stations, and the observations quoted in Table IV below show little evidence of movement through the Farne Islands and the Isle of May.

Western Europe.

There is some evidence of migration of House Sparrows from the south of Sweden (G. Rudebeck, *in litt.*). Observations have been made at Falsterbo at the extreme south and at Ottenby on the island of Öland in the Baltic, and small numbers of House Sparrows have been seen migrating southwards in the autumn each year in flocks of 5-40 birds with other migrants, flying out to sea in a S.W. direction. The majority of records are for October with a few birds in August and September. The numbers for some typical years are given in Table III (Rudebeck, 1950; and G. Svärdson, *in litt.*).

TABLE III—NUMBERS OF HOUSE SPARROWS (*Passer domesticus*) SEEN MIGRATING FROM SOUTH SWEDEN (JUNE TO NOVEMBER)

	1942	1943	1944
Falsterbo ...	—	1,040	489
Ottenby	66	81	321

The question of House Sparrow migration in Denmark has been examined by Krüger (1944). He gives seven records of birds being killed at lighthouses, 4 from March to May and 3 from September to November (1888-1939). These birds were killed at night and thus may well have been migrants. In autumn Krüger has seen migrating flocks on Amagar (26th September 1937 and 16th October 1938), the island lying between Zealand and Sweden; and there are records of odd birds at Christiansø (island in Baltic between Bornholm and Sweden) for 22nd October 1938 (1), autumn

1943 (1), 4th April 1937 (1) and at Hesselø (south Kattegat) for 8th April 1944 (3 ♀♀) and 31st April 1944 (2) (Krüger, *in litt.*). These records are very similar to those for the off-shore British Islands (see Table IV, below).

According to Gätke (1890) the young House Sparrows born on Heligoland emigrated at the end of July and some at least of the adults followed at the middle of September. He also recorded passage of birds in September and again in the spring.

Southern Europe.

The evidence from south-western Europe is rather similar. There are two records of birds on boats in the Bay of Biscay: an exhausted male 75 miles S.W. of Ushant on 17th October 1926 (Barker, 1927) and another landed on a boat (46°30'N. 6°45'W.) on 2nd November 1955. This latter bird stayed with the boat until it reached Tilbury (Snow *et al.*, 1955). The same observers saw a few House Sparrows moving westwards along the north Spanish coast with Tree Sparrows in October 1955 and Steinfatt (1933) saw birds setting out across the Straits of Gibraltar from Cape Marroque on 6th October 1932.

According to Meise (1936) the House Sparrow is an autumn- and winter-visitor to many places in upper Italy; e.g. at Cierfs in Munstertal some *domesticus* join *italiae* (Italian Sparrows) in autumn, perhaps from Ofenberg over the Ofer pass, which is 2,155 metres high. Hoffmann (1955, 1956) reports that the Italian Sparrow winters in the Camargue and two birds ringed there in the winter have been recovered in Piedmont the following spring (Table I, Nos. 28 and 30)*. Hoffman also considers that the local birds in the Camargue make movements of up to 40 miles in the winter.

Eastern Europe and Asia.

There is probably some migration of birds from the far north; for example, Seebohm (1901) considered that House Sparrows were arriving at Ust-Zylma (62°N. 52°E.) in the Petchora valley (here the race is *domesticus*) in May. This was near the northern limit of its range, which Seebohm (1880) placed at 68°N. in the Petchora valley. To the south, Bub (1955) observed House Sparrow (*domesticus*) migration between the Sea of Azov and the Caspian (S.W. of Stalingrad) in the period 12th-20th October 1942. Suffern (1920) recorded the arrival of a pair on a boat between Port Said and Crete on 6th October 1927.

In certain parts of its range the House Sparrow is partly or completely migratory. This appears to be particularly true of the sub-species *bactrianus*, which occurs from Transcaspia eastwards to the inner Himalayas and Tibet. In Turkestan the House Sparrow is a summer visitor raising only one brood each year

---

*I consider the Italian Sparrow is best regarded as a sub-species of *P. domesticus* (*P. d. italiae*) and for this reason the two recoveries of Italian Sparrows have been included in Table I.

(Kashkarov *et al.*, 1926). Similarly the breeding House Sparrows of the North West Frontier of Pakistan and Afghanistan migrate southwards (Ticehurst, 1922) and large numbers of *bactrianus* visit the plains of N.W. India in winter (Whistler, 1941).

OCCURRENCES AT NON-BREEDING STATIONS

A further way in which movement can be detected is by the appearance of birds at stations where they do not breed. Records of occurrences at islands round the British coast are given in Table IV. There is no evidence of extensive movement from these, but of course there are few places on the coast, from Yorkshire southwards, where observations of this sort could be made. Of the 16 records in the Table, 11 refer to the period April-May with 3 others in March and June.

TABLE IV—APPEARANCE OF HOUSE SPARROWS (*Passer domesticus*) AT NON BREEDING STATIONS

Station	*Distance from mainland*	*Date*	*No. of birds*	*Reference*
Farne Islands ...	2 miles	2.11.82	8	Watt, 1951
,, ,, ...	,, ,,	10.8.14	1♂	Mellor, 1919
Havergate Is. ...	1 mile	22.4.50	1♂	R.S.P.B., 1950
Isle of May* ...	5 miles	16.5.25	19	Elder, 1949
,, ,, ...	,, ,,	—.5.51	1♀	Elder, *in litt.*
Lundy	11 miles	5-9.4.50	1	Lundy Field Society Reports
,, ...	,, ,,	27.6.51	1(2?)	
,, ...	,, ,,	29.3.53	1♀	
,, ...	,, ,,	22-23.4.53	1♂	
,, ...	,, ,,	9.5.53	1♂	
Skokholm	2 miles	29.4.28–2.5.28	1♂	Lockley, 1936
,, ...	,, ,,	8-18.5.31	1♀	
,, ...	,, ,,	19.5.31	1♂	
,, ...	,, ,,	14.6.50	1♀	Conder, 1953
,, ...	,, ,,	20.5.53	1	

* 1 pair bred 1907; up to 6 pairs bred 1925-1947 (Elder, 1949).

Perry (1951) reports that the House Sparrow is a summer visitor to the island of Noss in Shetland. This island is now inhabited only by a shepherd from May to September. In 1946 one pair of House Sparrows bred, arriving on 28th April.

OBSERVATIONS ON COLOUR-RINGED BIRDS

Observations of colour-ringed birds in Hampshire and Co. Durham have given a general picture of the bird's life history. The birds of the year begin to take up nest-sites from February onwards, but they do not develop a strong attachment to the site until young have been reared in it. After this, however, the birds show a remarkable faithfulness to the nest; not only do the great majority of them rear subsequent broods in the same site, but throughout the year they show a strong attachment to it, visiting it daily and in many cases roosting in it. It is implicit in this statement that disappearance of marked birds that have bred in a particular site for one or more seasons is caused only by death and not by movement away. Evidence for this must necessarily be negative in character. I have never had any further knowledge of ringed adults after their disappearance from the breeding-area either as "sight" records, in spite of the fact that a regular watch has been kept in both study areas up to a mile away from the nests under observation, or as "recoveries" (except of course for those recoveries near the nests). In all, the lives of 71 adults known to have bred have been followed: 2 of these remained faithful to their nest-sites for 5 years; 1 for 4 years; 12 for 3 years; 33 for 2 years and 23 for one year. Many of these individuals were seen at their nest-sites almost daily over these periods and it thus seems most probable that disappearance can be connected with death. None of them has been seen more than about 100-200 yards away from the sites except during the period of grain-field flocking in the late summer and autumn (see below).

ROOSTING AND FEEDING MOVEMENTS

The flocking of House Sparrows at fields of ripening grain in the late summer is well-known. It has been suggested (Coward, 1926; and others) that these flocks are made up of town-living sparrows that move out to take advantage of the plentiful supply of food when the population is at its maximum. I have watched colour-ringed House Sparrows in two environments—a rural area (in Hampshire) and on the outskirts of a small town (in Co. Durham). In the first locality there was a grain-field about ½-mile away from the breeding colony under observation. A flock of about 500 birds formed at the field in the late autumn and the majority of the birds from the study-area were identified in this, the breeding adults travelling daily to and from the grain-field, the juveniles remaining and roosting at the field (Summers-Smith, 1954). In Co. Durham a flock, composed mainly of juveniles, began to form in July as the grass seeds ripened in a field within 200-300 yards of the study-area. Once the grass-harvest passed large flocks formed at the grain-fields a little further away. One of these flocks, which formed in a group of grain-fields about ¾-mile away from where I was colour-ringing and studying birds, numbered over 5,000 birds. A few colour-ringed birds were seen in this flock in 1955. Although this flock was much larger than the one near the south country village, the density of breeding sparrows in the Co. Durham area was very much higher and a flock of this size could easily have formed from birds that had moved less than a mile from their breeding-areas. These grain-field flocks persist until the grain is harvested. Perry (1951) records a flock of 25 birds in September at his cottage in Argyllshire 3 miles from the nearest breeding-station.

Large sparrow roosts in this country have been observed from time to time and presumably some of the birds must have made regular movements to and from them. C. Harrison (*in litt.*) observed a roost of about 10,000 birds near Croydon in the autumn of the 1950's. Flight-lines were found up to 3 miles from the roost.

In Egypt, Moreau (1931) made observations on House Sparrows (*niloticus*) near Cairo. In 1925 a large roost was in use from July to October. At the peak some 100,000 birds roosted together and Moreau was of the opinion that they came from a semi-circular area of about 4 miles radius.

HOMING

This term refers to the movement of birds artifically transplanted. A number of experiments have been reported and the results have been summarized in Table V.

TABLE V—HOMING EXPERIMENTS WITH HOUSE SPARROWS (*Passer domesticus*)

(a) Detailed Individual Recoveries

Age/ Sex	*Trapped*		*Released*		*Recovered*		*Distance B-C*	*Ref.*
	Date	*Place (A)*	*Place (B)*	*Distance A-B*	*Date*	*Place (C)*		
J.	22.6.35	Kiel-Kitzeburg	Laboe	3m.N.	26.4.36	Stein	3½m. N.E.	1
J.	,,	,,	,,	,,	–.12.35	Lutterbek	4m. S.E.	1
J.	,,	,,	Kiel-Gaarden	3m. S.	10.7.35	Kiel-Gaarden	—	1
J.	9.7.35	,,	,,	,,	4.11.35	Stein	8½m. N.E.	1
J.	10.7.35	,,	,,	,,	11.7.35	Kiel-Gaarden	—	1
J.	12.7.35	,,	,,	,,	16.4.40	Kiel Neumühlen	1m. N.E.	1
J.	28.6.35	,,	Möltenort	1m. N.	20.3.38	Kiel	3½m. S.E.	1
J.	29.6.35	,,	,,	,,	2.6.36	Heikendorf	½m. S.	1
J.	19.7.35	,,	,,	,,	–.7.35	Möltenort	—	1
—	14.10.33	Drewitz	Potsdam	3½m.	29.10.33	Drewitz	3½m.	2
—	19.10.33	,,	,,	,,	12.5.34	,,	3½m.	2
♂	30.4.49	Virginia Water	Sunninghill	3m. W.	30.7.51	Virginia Water	3m.	3
Ad.	1.5.32	Sway	—	3m.	12.5.32	Sway	3m.	3
—	25.5.36	Wilmslow	Heald Green	2½m. N.N.W.	8.8.36	Heald Green	—	3

References :—

1. Rademacher, 1951 : 69 House Sparrows ringed ; majority (exact number not given) released at Laboe, Kiel-Gaarden and Möltenort.
2. Wenkel, 1935 : 29 House Sparrows ringed October 1933 ; all released Potsdam.
3. British Trust for Ornithology records.

(b) Generalized Results

Trapped	*No. of birds*	*Distance*	*Remarks*
Richmond, Surrey	21	8m. N.E.	9 birds released individually, 4 at least returned Groups of 5 and 7 released, none returned. (C. L. Collenette, *in litt.*
Isle of May	14	5m. N.W.	None returned and none recovered. Included Ad ♂, 4.9.37; two 1st year birds, 25.9.37. (H. F. D. Elder *in litt*
Jersey	10	1½m.	7 returned, 1 within 6 days.
	12	2¾m.	2 returned, 1 within 4 days.
	—	5m.	1 returned. All experiments in winter 1951/52. (W. D. Hooke, *in litt.*
Sempach, Switzerland	—	<10m.	None returned, but settled in new area althoug some had left partially completed nests. (Schifferli, 1936 and 1943
Poland	17	½—8m.	2 recovered where trapped, maximum distance o return 6m. (Wojtusiack, *et al.*, 1945
Cornell University, U.S.A.	—	5—100m.	Individual birds returned after transplanting 5, 10 20 and 30m., but none from greater distances Some at 100m. settled where released. (Weaver, 1939

DISCUSSION

The general picture that emerges is that the House Sparrow is remarkably sedentary. The data from ringing recoveries suggest a dispersion rather than a genuine migration and this probably concerns young birds that have not yet settled down to breed. The evidence for migration along the west coast of Europe and the east coast of England is very inconclusive. The study of visible migration is liable to give a misleading picture unless carried out by a closely integrated chain of observers. One recent experiment of this type has given a negative result. During the second half of October and early November 1952 daily observations were carried out by a team of observers on the S.E. coast of England (Lack 1954). Although House Sparrows were seen moving southwards at South Foreland, Kent, no sparrows were seen at North Foreland (15 miles north), St. Mary's Bay (20 miles S.W.), Dungeness (25 miles S.W.), nor at the Kentish Knock Lightship (22 miles N. of North Foreland in the Thames approaches). During this period compatible observations on known migrant-species such as Starlings (*Sturnus vulgaris*) and Chaffinches (*Fringilla coelebs*) were made at the various observation points. It seems unlikely that if there was a genuine migration of House Sparrows at this time they would have been observed only at one of the stations. It would appear, however, that some coastwise movement of House Sparrows may take place, particularly in the autumn, and some of the birds may get "caught-up" in flocks of genuinely migrating Passerines and make short movements with them. Numbers of House Sparrows have been ringed in the summer and autumn at the east coast bird observatories at the Isle of May, Seahouses, Spurn, Gibraltar Point and Dungeness, but none of the recoveries so far has given any real evidence in favour of House Sparrow migration. The position, however, is by no means finally established and it is to be hoped that ringing of House Sparrows, particularly on the east coast, will be continued.

The results of homing experiments in general confirm these conclusions, though it should be pointed out again that the majority of homing experiments have been carried out with "immature" birds (using this term to include birds that have not yet bred). We should not expect such birds, which have not yet developed a strong attachment to a particular area, to exhibit much homing.

On the other hand the evidence does suggest some dispersal, probably of young birds, in the autumn. This is possibly an extension of the movement to the grain-fields. The bird No. 21 in Table I had moved 25 miles 9 days after being ringed as a nestling. The time interval is not known as accurately for the other recoveries, but it is clear that a number of birds have still not settled down by March. Table IV indicates, in addition, that some movement continues into the early summer. This suggests a second dispersal of first-year birds, particularly males, that have not found mates or suitable nesting-sites. A very similar picture is given by the occurrences of House Sparrows at Danish lighthouses—odd birds from September to November and again from March to May.

The large proportion of ringed nestlings and juveniles that are subsequently recovered at all times of year within a mile of the place of ringing and observations on colour-ringed birds suggest, however, that the majority do not go far from their birthplace. Of 16 recoveries of nestlings ringed in Britain 15 were "where ringed", the other bird moved 30 miles (Table I, No. 4). For most birds the maximum movement in their lives, to feeding places and communal roosts, will be at the most a distance of only 2-3 miles.

Part II—Extension of Range

The range of the House Sparrow in the Palaearctic region has increased very considerably in recent times, and from small introductions to many other parts of the world the bird has multiplied and spread in a remarkable way, so that it is now present in over half of the inhabited area of the earth. The rapidity with which this spread has taken place is surprising in view of the sedentary habits of the bird, and it may thus be interesting to consider some of the better documented cases and see how this increase of range fits in with the evidence for movement presented in Part I.

In this section of the paper we are concerned only with birds of the sub-species *domesticus,* which we have seen is largely sedentary, at least in Europe. Introductions to America, etc., have almost certainly been of birds of this non-migratory stock from western Europe.

Siberia.

The House Sparrow has arrived comparatively recently in Siberia and as yet has occupied only a small proportion of the territory. The exact details of the spread do not appear to be well documented, but the major direction of movement has been eastwards across to the Pacific coast in a narrowing belt following the route of the Trans-Siberian railway with extensions northwards from this up the valleys of the Ob, the Yenisei and the Lena.

The spread appears to have begun in about 1800 when the bird first appeared on the Irtish (70°E.), when the Russians began to till the soil there. From there the bird spread eastwards along the valley of the Ob and on towards Lake Baikal reaching 102°E. by 1850. In 1928 House Sparrows were in Khabarovsk (49°N. 135°E.) and at Nikolayewsk in the following year (Stachanow, 1931). The data do not allow of an accurate calculation of the rate of spread, though a very approximate estimate of 25 miles per year may be made.

In the valley of the Ob the sparrow was at Berezovo (64°N. 65°E.) in 1876; by 1897 it was within the Arctic circle and by 1930, at least, up into the Yamal peninsula. This would give an annual spread of about 10 miles. In the Yenisei valley it was at Worogowo in 1840 and by 1870 had moved 500 miles northwards along the river valley into the Arctic circle. Here the rate of spread has been about 17 miles per year (for details, see Dixon, 1892; Stachanow, 1931; and Southern, 1945).

North America.

The House Sparrow was introduced to the New World in 1850 when a number of birds were liberated in New York. Subsequent introductions were made to other parts of North America and thus, although we know that it was present in all of the United States by 1905, it is not possible to trace its unassisted spread and determine the rate. On the other hand there is no evidence of its introduction to the southern States and we know that it penetrated to San Luis Potosi (23°N. 101°W.) in central Mexico in 1927 and to Guadaljaro (21°N. 104°W.) on the west coast by 1930. There are two possible routes of spread: from San Francisco, where the bird was present in 1872, and from Galveston (29°N. 95°W.), where it was recorded in 1862. From Galveston to San Luis Potosi is about 1,100 miles. This would give a rate of spread of 17 miles per year, and on to Guadaljaro, a further 200 miles, a rate of 19 miles per year. The alternative route down the west coast from San Fransisco to Guadaljaro is about 1,250 miles; here the rate of spread would be 22 miles per year (see Heilfurth, 1931; Gebhardt, 1944).

South America.

Sufficient information exists about introductions to Argentina and Chile to enable the rate of spread to be traced.

House Sparrows were released in Buenos Aires in 1872 and from there they have spread to the north east through Uruguay to the Rio Grande do Sul, the most southerly state of Brazil. Northwards the bird has crossed through Paraguay and reached into Brazil in the Matto Grosso State. West of this the spread has gone through the north of Argentina into southern Bolivia. Southwards it has reached to Patagonia and across to the border of Chile (see Gebhardt, 1944). Let us consider some of this in more detail

(a) North-eastwards. Sparrows were introduced into Uruguay in 1888 and as well had spread there from Buenos Aires by that time. The bird was in Brazil by 1912, reaching Porto Alegre by 1917. Taking only the spread from Uruguay, we have an extension of range of approximately 450 miles in 29 years or a rate of 16 miles per year. Further north the bird was in San Paulo in 1937 but may have spread there from Rio de Janeiro, where it has also been introduced, rather than from the south. A further introduction was to S. Gabriel (31°S. 54°W.) in 1920, but the bird probably had already arrived there from Uruguay by that date.

(b) Northwards. The bird was in Asuncion in Paraguay in 1920, but had presumably been there some years by that date. The spread continued along the Paraguay river into Brazil and was at Corumba (19°S. 58°W.) in 1928. The distance here is 1,100 miles and the rate 20 miles per year. A different route northwards has been along the Parana river reaching Brazil and spreading north to the source of the Araguaya (18°S. 53°W.) by 1925—1,250 miles at 22 miles per year. A third extension has been up through Jujuy (24°S. 65°W.) in northern Argentina into Bolivia and to the upper Pilcomayo by 1928. Here the distance is 1,050 miles, a rate of 19 miles per year.

(c) Southwards. The spread is less well documented. The bird was at the Rio Negro in 1920 (500 miles, 10 miles per year) and on the border of Chile at the Rio Neuquén (37°S.) by 1937. It is more probable that the House Sparrow reached here via Bahia Blanco than from Chile; this would involve a distance of approximately 900 miles at a rate of 14 miles per year.

Another centre of spread in South America has been Santiago in Chile where the bird was released in 1904. From here it has spread both northwards and southwards along the coast. Northwards from Santiago it had reached Caldera (27°S. 71°W.) (460 miles) in 1919 and Antofagasta (24°S. 70°W.) in 1924. The total spread here is approximately 675 miles and the rate 34 miles per year. Southwards the bird was in Concepción (37°S. 73°W.) in 1918 (250 miles) and in 1929 had reached beyond Angol (38°S.

73°W.) and to within 125 miles of Valdivia (40°S. 73°W.). This means a total advance of 340 miles and gives a rate of 14 miles per year. The first stage of the journey—to Concepción—shows a more rapid advance of 18 miles per year.

The estimated rates of spread for different areas are summarised in Table VI.

TABLE VI—RATE OF SPREAD OF HOUSE SPARROW (*Passer domesticus*) IN SIBERIA AND NORTH AND SOUTH AMERICA

Place	*Date*	*Distance involved, miles*	*Rate of spread, miles/year*
Siberia : east to R. Amur	1850-1930	2,000	25
Ob valley	1876-1930	350	10
Yenesei valley	1840-1870	500	17
N. America : Texas-Mexico	1862-1927	1,100	17
California-Mexico ...	1872-1930	1,250	22
S. America : Uruguay-Brazil	1888-1917	450	16
Argentina-Paraguay-Brazil	1872-1928	1,100	20
Argentina-Brazil ...	1872-1925	1,250	22
Argentina-Bolivia ...	1872-1928	1,050	19
Argentina-Chile	1872-1937	900	14
Chile, north	1904-1924	675	34
Chile, south	1904-1929	340	14

New Zealand.

The House Sparrow was introduced to the mainland of New Zealand in 1866. It has spread over North and South Islands and has also been recorded on a number of the outlying islands. Though it may have been transported from the mainland to some of these, it is almost certain that it has appeared on others without human assistance. The islands on which it has appeared and the distances from the mainland are: Chatham Is., 400 miles E.S.E.; Campbell Is., 350 miles S.; Snares Is., 60 miles S.W.; Auckland Is., 200 miles S.; Norfolk Is., 450 miles N.W. (These are five out of the eight island groups lying around New Zealand within a distance of 550 miles.) Williams (1953) has suggested that dispersal of the House Sparrow and other introduced European Passerines from the main islands has been brought about by strong winds. Possibly relevant in this connection are the occurrences of a House Sparrow on Jan Mayen (Marshall, 1952) and the appearance of an exhausted bird on a ship 800 miles from the Irish coast (55°N. 30°W.) in June 1942 (W.B.S., 1943).

Australia.

The House Sparrow was introduced to the S.E. corner of Australia—Melbourne and Sydney districts—about the middle of last century. From there it has spread northwards up the east coast beyond the Tropic of Capricorn, and westwards into South

Australia and north from there towards the Northern Territory. It has, however, failed to spread to Western Australia. This failure is extremely interesting. During the construction of the transcontinental railway (1912-1917) a man was employed to shoot the sparrows that appeared at the railhead construction camps. This was done and the sparrow is still absent from the State (Southern, 1945). The maximum distance between stations across the Nullarbor Plain is 70 miles and the average distance slightly less than 50 miles. We have seen that there are a few records of individuals in Europe moving this distance or slightly further; however, it should be pointed out that the country between the stations on the Nullarbor Plain is waterless and unsuitable for sparrows and the human populations at the stations themselves very small. Thus we can see how spread of the House Sparrow will only take place over continuously suitable habitat unless assistance across unsuitable areas is provided by man. For example, A. W. Boyd (1917) found that the Egyptian House Sparrows (*niloticus*) followed the cavalry across the Sinai Desert from the Canal Zone during World War I and were to be found at all of the desert camps. They may even have crossed the desert in this way* and joined up with *biblicus,* the subspecies occurring in Palestine, Syria, Turkey and W. Iran. Apart from plumage differences *niloticus* is a much smaller bird than *biblicus* (mean wing-lengths: ♂♂, 74.5 mm. and 79 mm. respectively). It would be interesting to find out if the birds at present occurring in the south of Israel are intermediate in character.

DISCUSSION

Viewed in relation to its established sedentariness the extensions of range become truly remarkable. Although the estimated rates of spread, 10-35 miles per year, are within the known compass of movement of the House Sparrow, only 2% of the recoveries of ringed birds have been at distances of greater than 10 miles from the place of ringing. It should also be noted that this rate of spread has continued in many places for more than 50 years. Some of the spread has without doubt been assisted, albeit unconsciously, by man, as for instance to the Falkland Islands (Hamilton, 1944), the Faeroes (Williamson, 1945) and the north of Norway (Lund, 1956), where the birds have travelled on ships, and also in north Siberia, where the birds have moved down the rivers on grain-barges, but much of it must have been unaided.

Much has been written about the spread of the Fulmar (*Fulmarus glacialis*) in the eastern Atlantic region (see Fisher, 1952), but it is interesting to note that the rate of spread of this species, a wide-ranging one in no way comparable with that of the sedentary House Sparrow, has only been about 10 miles per year.

In some parts of its range the House Sparrow is regarded as an unwanted pest, particulary because of its depredations on grain-fields, and some form of control either by shooting or poisoning

*See comment on page 512.

has been advocated. From this study of its movements we should not expect that it would be possible to keep an area free of House Sparrows unless regular and extensive actions were taken. Russell (1885) gives details of how in two areas House Sparrows were eliminated by constant shooting throughout the year so that thriving colonies of House Martins (*Delichon urbica*) were able to breed unmolested. However, when shooting at one of these was stopped the House Sparrows returned and completely dispossessed the martins in one season. The rapidity of colonization is also shown by the way in which the new towns, such as Newton Aycliffe in Co. Durham, have very soon acquired flourishing House Sparrow populations.

Part III—Sub-species and Regional Variations

The general picture that has emerged so far is that House Sparrows belonging to an established population, as distinct from an expanding one, are remarkably sedentary. On the other hand when the bird has come into contact with a new area where its ecological niche has not been occupied by another species the multiplication in numbers and rate of spread have been equally remarkable. These circumstances present two interesting possibilities from the evolutionary point of view. In the old-established parts of its range this sedentary behaviour may have led to the formation of genetically different populations within areas where its habitat, viz. built-up areas and the agricultural land surrounding, is continuous and, with prolonged separation, different strains may have arisen in these "isolated" populations. On the other hand, in the areas where there has been a rapid increase in numbers selection must have been less severe than normally and it might be expected that in these places extremely variable populations would have arisen.

Sufficient information has recently become available, by the publication of data on two large series of House Sparrows from Germany, to enable an examination to be made of the effect of "isolation". Lack (1940) examined a number of House Sparrows from different parts of the U.S.A. and found that the birds in America were no more variable than the European ones and did not differ significantly from them. Lack points out, however, that an adequate sample of birds from a rapidly expanding population was not available for investigation. It is of course possible that selective factors have had time to reduce the variability though it would be surprising if the selective factors operating have been similar enough to those in Europe to result in an identical population. It does appear more likely that no significant increase in variability has occurred and sufficient time has not elapsed for the evolution of a new form. It is to be hoped that sufficient specimens will be obtained from areas in which rapid colonization is still taking place to throw more light on this interesting question.

Let us now consider the birds in Europe, an area in which House Sparrows have been present for some time, apart from recent small extensions in the extreme north, and from where considerable data are available.

The nominate race *domesticus* occurs throughout Europe, apart from Italy and Iceland, and across northern Asia to the mouth of the Amur river. Various sub-species have been separated in this area, viz. *hostilis,* Great Britain; *diniz,* Portugal; *balearoibericus,* Balearic Islands; *sibiricus,* West Siberia, but the differences from *domesticus* have not been enough really to justify sub-specific classification. Kleinschmidt (1915) in a comparison of 90 British skins with 50 German ones (all males) found only 20% were separable on size. (The accepted rule for separation is that at least 75% of one population should be distinguishable from the other.) At the other extreme Stachanow (1931) was unable to separate specimens from Khabarovsk on the river Amur from central Russian ones. A cline exists across Europe; the wing-length, for example, increases from west to east (Table VII).

TABLE VII—WING-LENGTHS (MM.) OF MALES OF DIFFERENT EUROPEAN POPULATIONS OF HOUSE SPARROWS (*Passer domesticus*)

District	*No. of birds*	*Wing-length (mm.)*			*Reference*
		Mean	*Range*	σ†	
England	100	75·7	71-80	1.85	Lack, 1940
,, ...	66	76.2	72-81	—	Stresemann, 1913
W. Germany: N. Rhine Westphalia ...	650	77.8	73-84	1.57*	Niethammer, 1953
Central Germany: Saxony-Anhalt ...	392	78.8	73-84	1.73*	Grimm, 1954
Saxony	75	78.7	74-84	1.79	Meise, 1936
Poland	8	80.5	79-82	—	Meise, 1936

†σ = Standard Deviation.

* Calculated from the data given in the paper assuming that the samples (see Table VIII) belong to one population.

As a result of poisoning actions in Germany against House Sparrows, considerable data have become available for a number of local populations. This is extremely interesting as it has shown that significant differences in certain characters may exist between populations living comparatively close to each other. As an example we may consider again the wing-length of males. The data for three groups of populations are given in Table VIII. The first two refer to German birds. One consists of populations from eight villages in North-Rhine Westphalia lying within 100 miles and the measurements were obtained from freshly killed birds in March 1952 (Niethammer, 1953). The other consists of populations from three districts near Halle in Saxony-Anhalt

TABLE VIII—WING-LENGTHS (MM.) OF TWELVE POPULATIONS OF HOUSE SPARROWS (*Passer domesticus*) (MALES)

District	*Locality*	*No. of birds*	*Wing-length (mm.)*			*Reference*
			Mean (M)	*Range*	σ†	
North-Rhine Westphalia	Mersch	125	77.78	73-81	1.46	Niethammer, 1953
	Gereonsweiler	79	77.32	74.5-82	1.46	,,
	Widdendorf	109	78.12	74-82	1.43	,,
	Buchholz	95	77.64	74-84	1.73	,,
	Schaan	79	78.73	75.5-83	1.62	,,
	Waat	43	78.23	75-81.5	1.79	,,
	Ruhne	35	77.89	75-81.5	1.58	,,
	Eikeloh	85	77.05	73-81	1.69	,,
Saxony-Anhalt	Hohenthurm	247	78.61	73-83	1.73	Grimm, 1954
	Oppin	69	79.32	75-84	1.69	,,
	Buschdorf	59	79.12	74-82	1.71	,,
Co. Durham	Stockton-on-Tees	33	78.27	75-82	1.62	—

†σ = Standard Deviation.

(distant some 250 miles from the group I area), measured in December 1952 and January 1953 (Grimm, 1954). The third group is a small one from Stockton-on-Tees, Co. Durham (distant about 500 miles from the group I area), the measurements being made on live birds trapped in 1955. The differences between the mean wing-lengths of the twelve populations taken in pairs are compared in Table IX. The figure given is number of *standard errors of the difference* between the mean wing-length of the populations being compared

$$\left\{ = \frac{M_1 - M_2}{\sqrt{\sigma_1{}^2/N_1 + \sigma_2{}^2/N_2}} \right\}.$$

A difference of greater than two standard errors is probably significant, whereas a difference of three or more standard errors is highly significant.

It can be seen that highly significant differences exist between almost half of the pairs of populations and that differences that are at the least probably significant exist between two-thirds of the pairs. These differences are found not only between populations from the different groups but also within groups I and II themselves. This last was shown by Grimm (1954) for the group I populations though it was not recognised by Niethammer (1953). In spite of the existing east-west cline the Stockton birds are significantly larger than some of the German populations as well as being significantly smaller than others.

The wing-lengths of the Stockton males are markedly larger than the English samples quoted in Table VII. It is not considered, however, that this is only a systematic difference resulting from different measuring techniques as six males measured at Spurn in 1955 had a mean wing-length of only 73.8 mm. (range 71-76 mm.) compared with a mean of 78.3 mm. (range 75-82 mm.) for Stockton. This would suggest that similar differences are likely to be found between different House Sparrow populations within this country.* Further information on this point would be interesting and it is suggested that ringers handling a reasonable number of House Sparrows per year should make measurements

ABLE IX—SIGNIFICANCE OF DIFFERENCES IN WING-LENGTHS OF TWELVE POPULATIONS OF HOUSE SPARROWS (*Passer domesticus*) (MALES)

	Mersch	Gereonsweiler	Widdendorf	Buchholz	Schaan	Waat	Ruhne	Eikeloh	Hohenthurm	Buschdorf	Oppin
ereonsweiler	2.22										
Viddendorf	2.03	3.75									
uchholz	0.64	1.33	2.14								
chaan	4.27	5.76	2.68	4.29							
Vaat	1.49	2.89	0.36	1.92	1.61						
uhne	0.37	1.84	0.77	0.80	2.72	1.30					
ikeloh	3.26	1.10	4.67	2.31	6.50	3.88	2.72				
Iohenthurm	4.92	6.55	2.79	4.65	0.56	1.29	2.49	2.62			
ppin	6.43	7.69	4.91	6.24	2.17	3.71	4.79	8.32	3.08		
uschdorf	5.22	6.52	3.82	5.20	1.36	3.13	4.28	7.17	2.05	0.66	
tockton-on-Tees	1.58	3.10	0.48	2.10	1.54	0.16	1.48	4.10	1.12	3.64	3.05

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*Mr. Frudd has very kindly placed at my disposal measurements made on House Sparrows at Ossett, Yorkshire, in 1955-56. For 49 males the mean wing-length is 75.85 mm. with a range of 72-79 mm. and a standard deviation of 1.76. The *standard error of the differences* between this and the Stockton males given in Table VIII is 6.40, i.e. it is highly significant. This provides further confirmation of the way in which local populations differ from each other.

on the birds. Wing-length can readily be measured in live birds and, as most information is available for this character, it would appear to be the best parameter to measure. Measurements should be confined to adult birds not showing signs of moult or abrasion.

Although the character "male wing-length" has been chosen for this argument significant differences in female wing-length are also found in the same populations. In addition there is a strong positive correlation ($r = + 0.85$) between the wing-lengths of males and females for the different populations, lending support to the view that real genetical differences exist between the populations. Similarly, Grimm (1954) has shown that significant differences in body-weights of the eleven German populations shown in Table VIII also occur and no doubt this could be proved for other characters as well.

In the Hampshire study area observations were made on the breeding of 25 "isolated" colonies of House Sparrows lying within an area of two square miles (Summers-Smith, 1954). It is interesting that the onset of breeding differed from colony to colony, the difference being in some cases as much as three weeks. This suggests a possible physiological difference between the different colonies. No morphological examination of birds was made so that it is not known if they also differed in physical characters.

It is difficult to see how the differences between the studied populations could have originated adaptively by selection. Could they have originated in accordance with Sewell Wright's theory of genetical drift? Although this hypothesis is mathematically irrefutable some doubt has been expressed whether or not it operates in nature. No details are available on the different environments from which the sparrow material was obtained, but it seems unlikely that within the two groups of German birds there could have been sufficient differences to have given rise to adaptive variations.

These results certainly support the evidence for the extreme sedentariness of European House Sparrows. It is interesting that in the enormous area from the extreme west of Europe to the Pacific coast of Siberia no differentiable sub-species have evolved; though of course the eastern part of this has only been occupied comparatively recently and sufficient time has probably not elapsed for differentiation to have occurred. Over half of the "resident" British Passerines are separable on sub-specific grounds from the Continental forms and a number of sub-species have been identified within the British Isles themselves. In some species the British birds are non-migratory while the Continental representatives of the same species are migratory. Sedentariness has evolved in these birds as an adaptation to the oceanic climate of these islands without its extreme of temperature. The House Sparrow, however, has in addition been able to evolve a sedentary way of life on the western European mainland; by associating closely with man it is able to find sufficient food in the form of scraps throughout the winter, to enable it to survive without migrating southwards or westwards. It is interesting that even at the northern limit of its range the House Sparrow is at least to some extent still a resident. It regularly winters at Kiruna, Sweden (68°N.) (Snow, 1952) and in Finmark (Lund, 1956); thus even here the House Sparrow can be at the most only a partial migrant. The differences between British and Continental forms of many species may remain fixed as a result of this variation in behaviour. Without this difference in behaviour between British and Continental House Sparrows, together with the small amount of wandering of House Sparrows that does take place, the separation of geographical races may have been prevented or possibly obscured by the random variations that occur in small local populations. Alternatively, it may be that in the House Sparrow's rather artificial environment ecological differences are less marked and there has not been the same selective advantage in adaptation as in other species living in more natural habitats.

Further eastwards in its range, as we have already seen, the House Sparrow is still completely or partially migratory. The reason for this is not known, but presumably there is some ecological difference. Possibly the birds there are not so closely associated with man. This, for example, appears to be the case with *bactrianus*. Ticehurst (1922) found *parkini* (= *bactrianus*) in Sind in winter right out in the grass jungle, whereas *indicus* (the sub-species extending from Arabia to Burma, which is resident in India and Pakistan) was never far from human habitations.

Conclusion

The clue to the House Sparrow's sedentary behaviour may lie in its adaptation to complete dependence on man. Its habitat is thus not continuous. Blackwell and Dowdeswell (1951) have shown how Blue Tits (*Parus caeruleus*) in winter could become separated into "semi-isolated communities by a physiographic barrier" and in a similar way isolated House Sparrow communities may be formed. These may be extensive as in a large built-up area or quite small as at an isolated hill-farm. The habitat requirements change somewhat in the summer and autumn and the discontinuous habitats of the remainder of the year may then merge to some extent and allow a drift of young birds not yet strongly attached to a particular locality to occur. This would prevent complete genetical isolation and provide the means whereby a region inhabited by man could be rapidly colonized, whether this is an area artificially cleared of House Sparrows by man or a new region of suitable habitat to which it is introduced. Even a small area of unsuitable habitat is likely, however, to provide a barrier which it cannot cross unless assisted by man.

The House Sparrow is particularly well placed for evolution to a sedentary way of life. Living in close association with man it is able to rely on a constant supply of food, which is independent of the weather (or even augmented in severe weather). It is perhaps relevant in this connection that of the ringed adults I have observed more have died (disappeared) in the breeding-season and moult than during the winter-months (60% April-September; 40% October-March). At the one time of year when food supplies in the restricted area around the breeding-colony may become inadequate, that is in the summer when the population is at its highest, some movement does take place to make use of the plentiful supply of food at the ripening grain fields. Here it may be noticed that this type of movement concerns the juveniles much more than the adults (particularly the males) which still retain a considerable attachment to their breeding-areas.

In many other species the difficulty of obtaining food in the winter has been overcome by the evolution of only partial sedentariness, whereby the adults, or possibly only the adult males, are sedentary while the remainder of the population move away to a more favourable area in the winter months. Again, other species make "weather movements" during periods of exceptional severity to overcome this difficulty. With birds like the Chiffchaff (*Phylloscopus collybita*) and Blackcap (*Sylvia atricapilla*) a few individuals regularly over-winter in England. It seems probable that, if conditions in this country changed markedly enabling the birds to obtain food during the winter-months more easily, sedentary populations of these species would quickly evolve.

Clearly, provided the question of food is adequately answered, there are a number of advantages to be gained from adopting sedentary habits. The hazards of migration, which, calling for exceptional physical efforts, must impose a severe strain on individuals, are eliminated. Nesting-sites are maintained throughout the year and young birds can obtain mates and nest-sites early in the season so that breeding can begin as soon as circumstances are favourable. No storage of energy in preparation for migration is necessary and thus the birds can have an extended breeding-season enabling a large number of broods to be reared. The danger of extreme sedentariness would of course be the formation of small inbred populations that lose the inherent adaptability necessary to meet changing conditions. This should not have occurred in the House Sparrow because of the dispersal of a small number of juveniles, which will maintain a regular flow of genes throughout the stock, though the evolution of physical differences between neighbouring populations suggests that this flow is not sufficient to prevent chance evolution of different strains of restricted variability.

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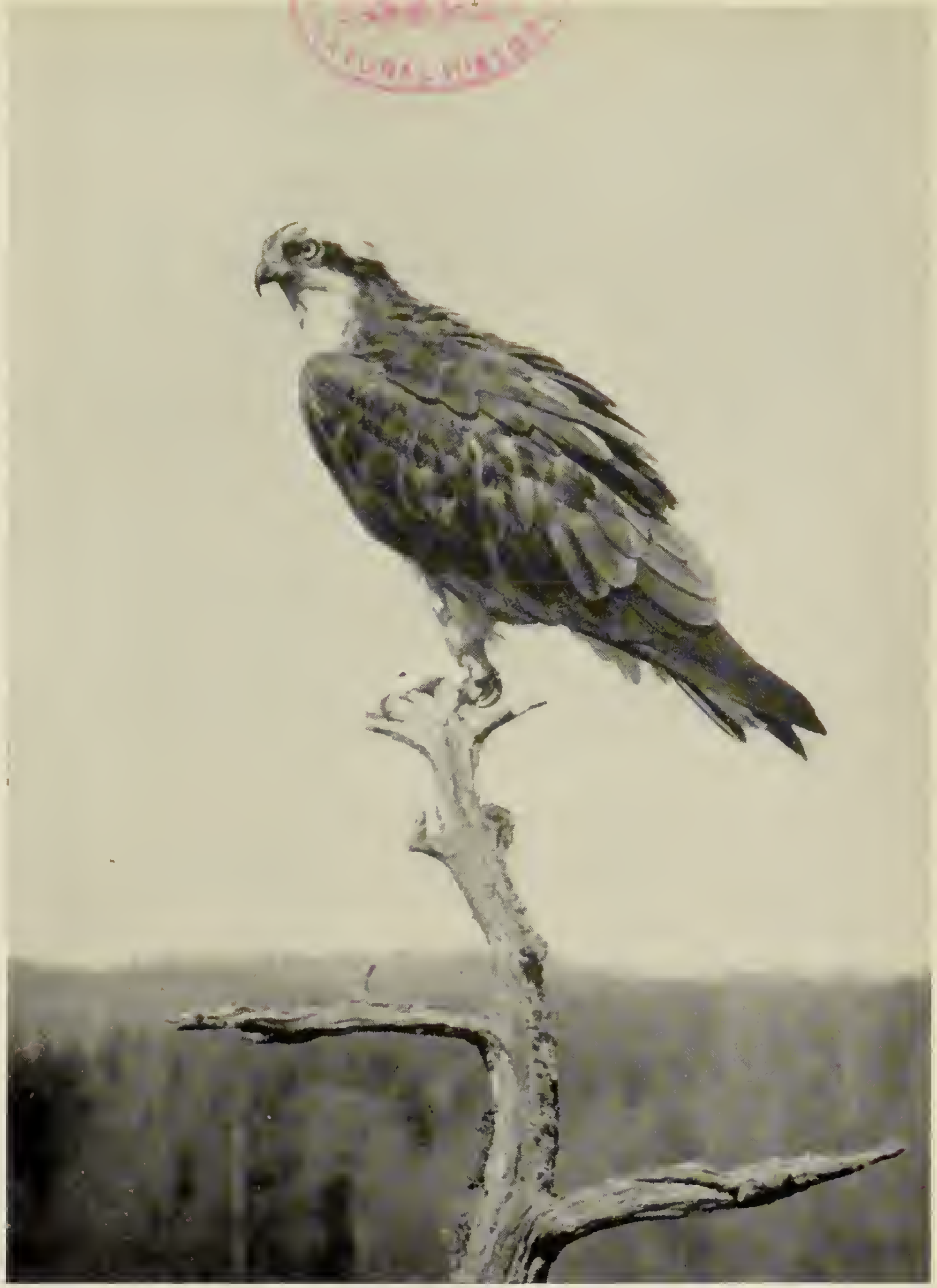
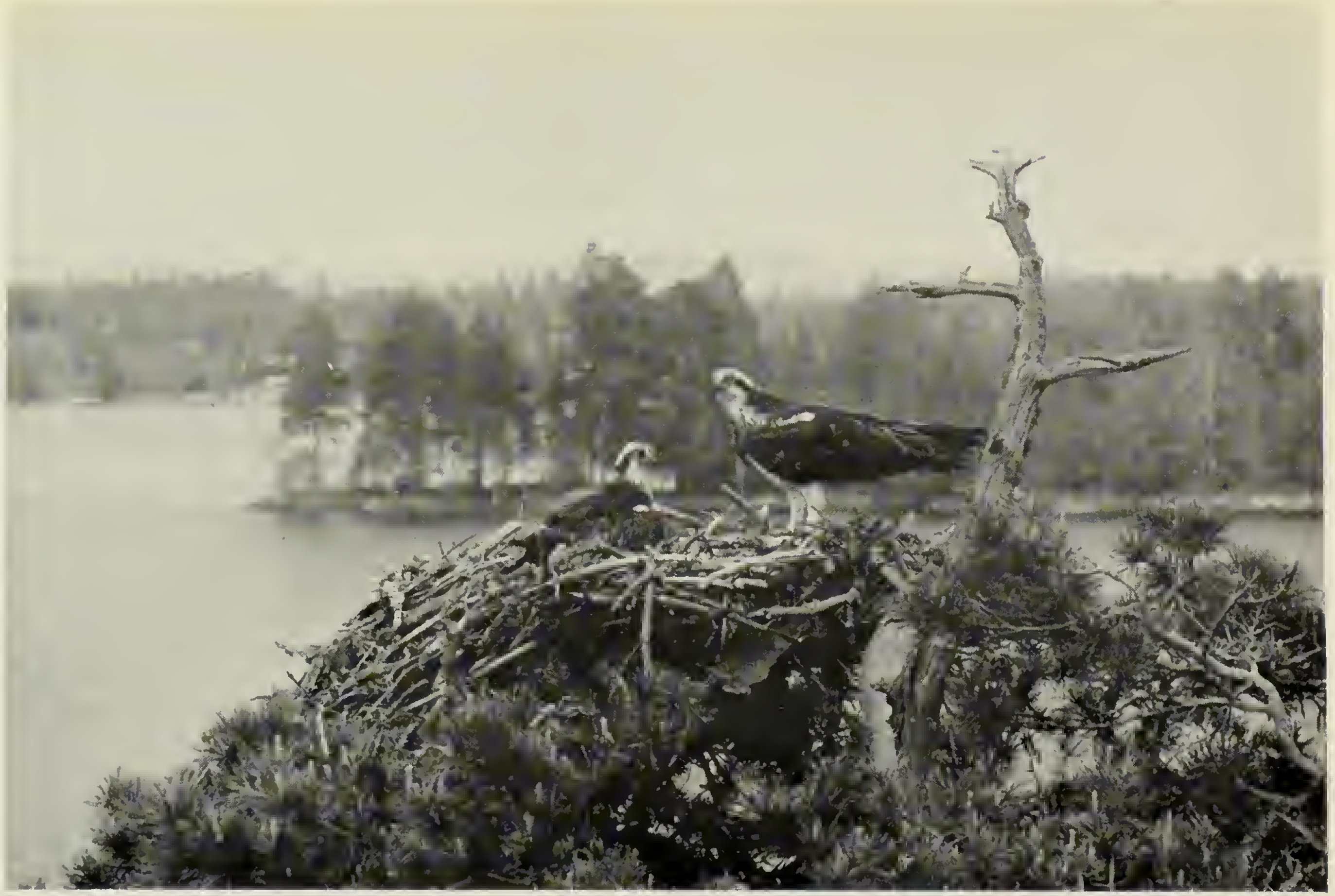


M. D. England

FEMALE OSPREY (*Pandion haliaetus*): SWEDEN, 1955

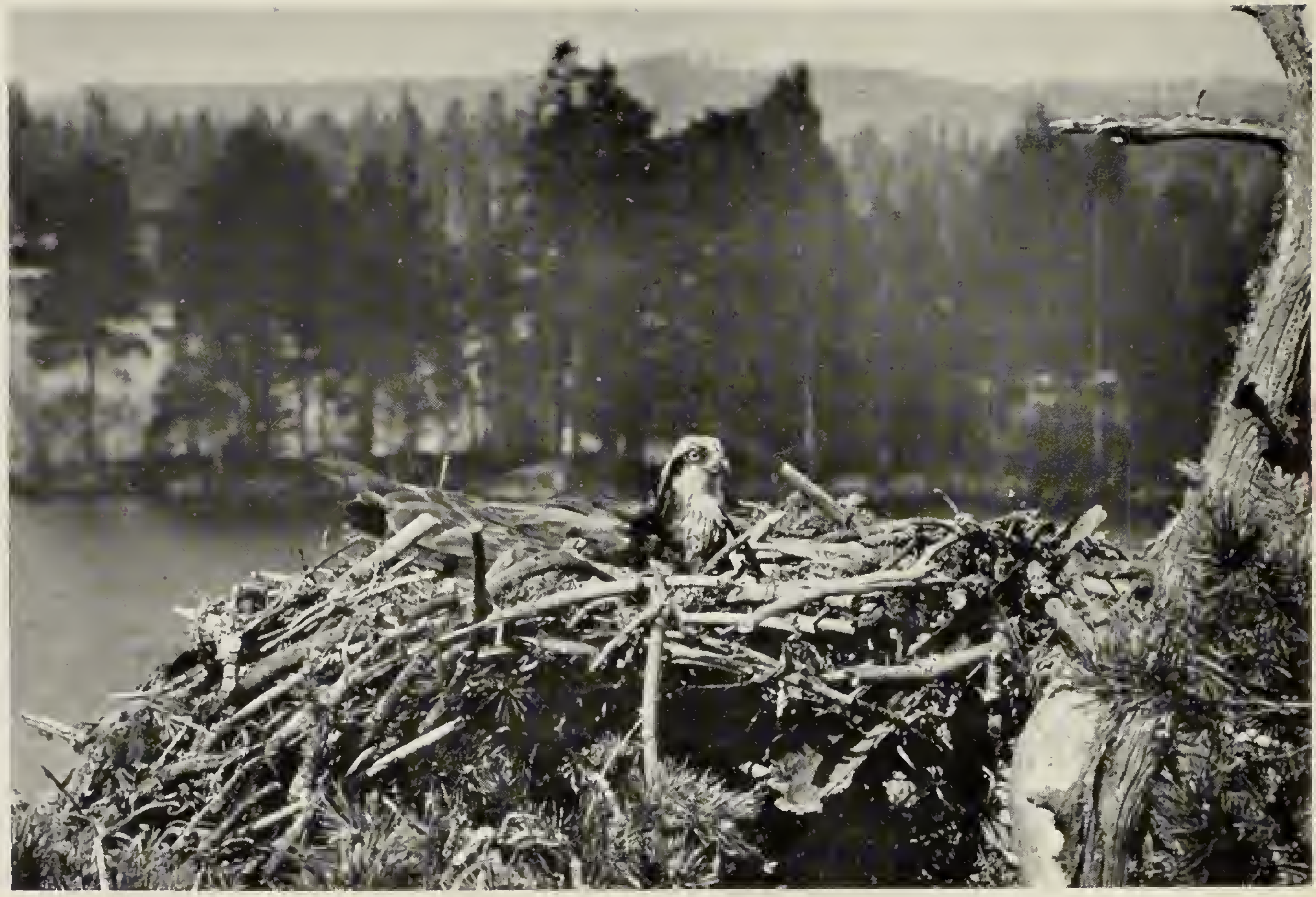
There is little difference between the sexes, though the male averages smaller and has purer colours. This close-up shows the whitish head with the dark band through the eye and down the neck, joining the uniform blackish upper-parts; the medium-length tail with the wing-tips crossing beyond it; and the strong black bill with the upper mandible curving down (see pp. 489-492).



M. D. England

PAIR OF OSPREYS (*Pandion haliaetus*) AT NEST: SWEDEN, 1955

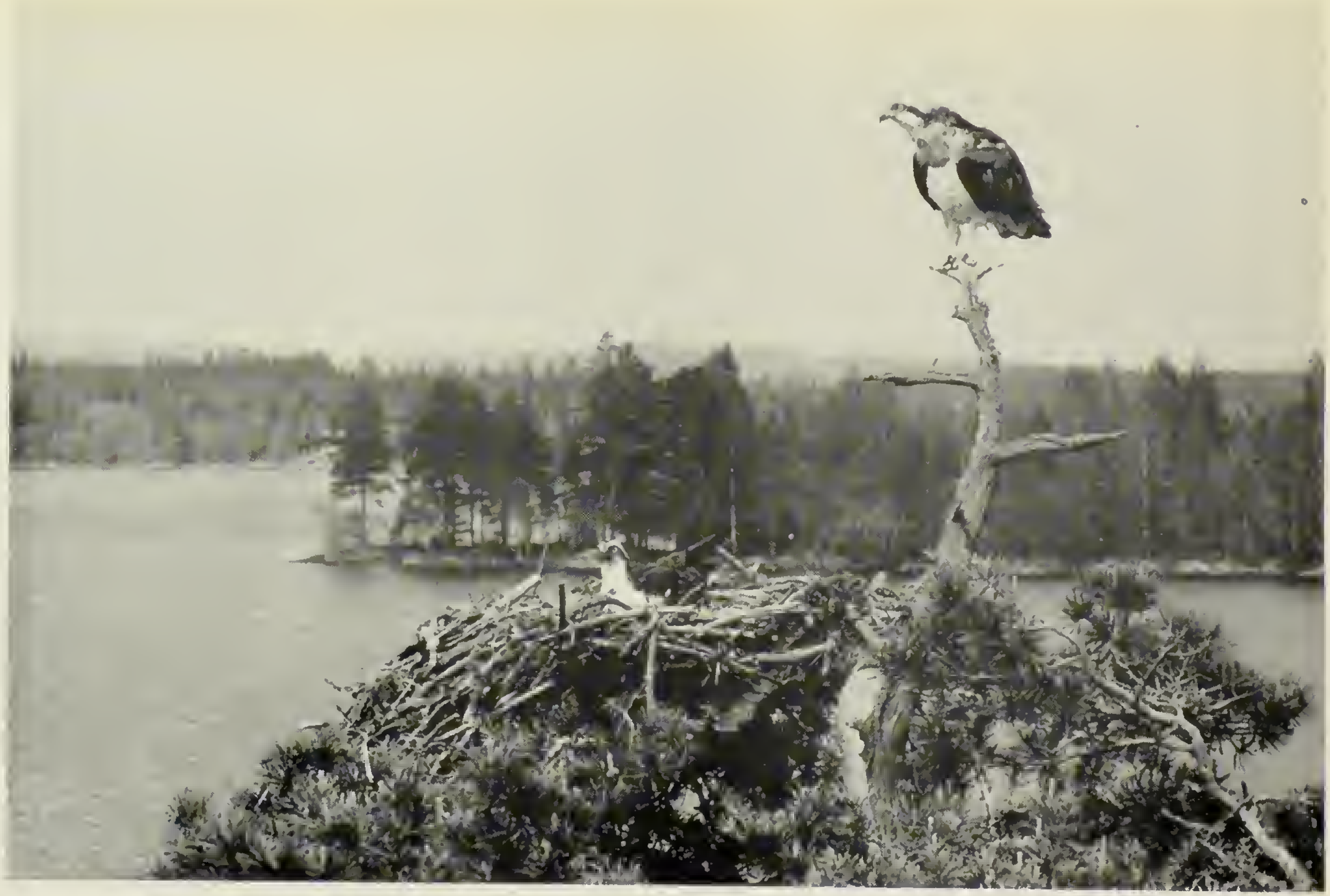
In central Sweden Ospreys seem to favour the tallest trees as nest-sites and almost invariably choose one which has a bare portion at or near the top, as in this case. Proximity to water is not, however, an essential feature (see plate 72, left, and page 491). In America (and to a much lesser extent elsewhere) the Osprey nests in loose colonies.



M. D. England

FEMALE OSPREY (*Pandion haliaetus*) INCUBATING: SWEDEN, 1955

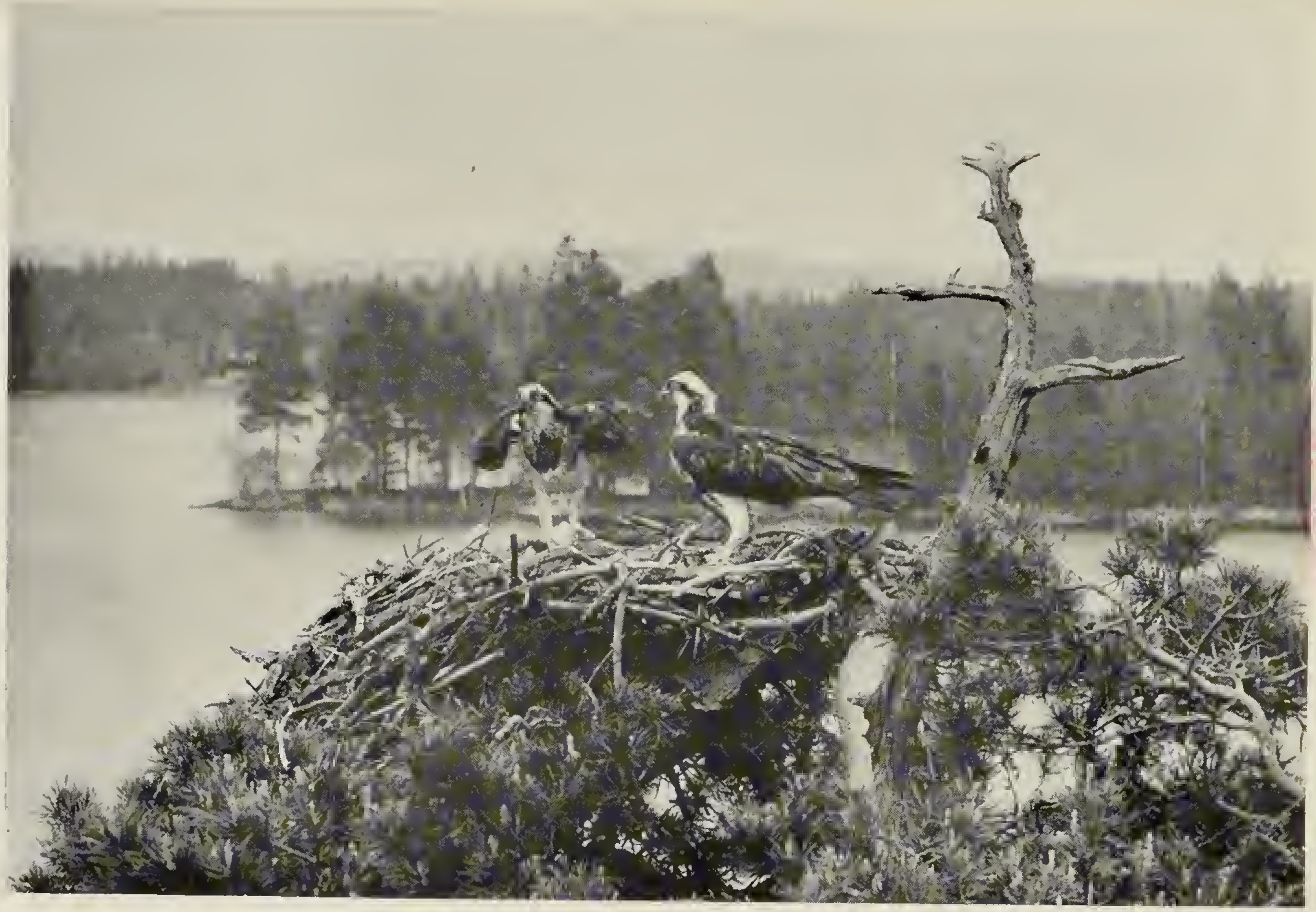
The nest itself is made chiefly of sticks, but may include almost anything else available, from heather and seaweed to bones and paper, and, being added to year after year, is often an enormous structure. This nest —which was of considerable size despite its being only two years old—contained 3 eggs, the normal clutch; the eggs are usually laid at two-day intervals, incubation beginning with the second.



M. D. England

MALE OSPREY (*Pandion haliaetus*) INCUBATING, FEMALE ABOVE

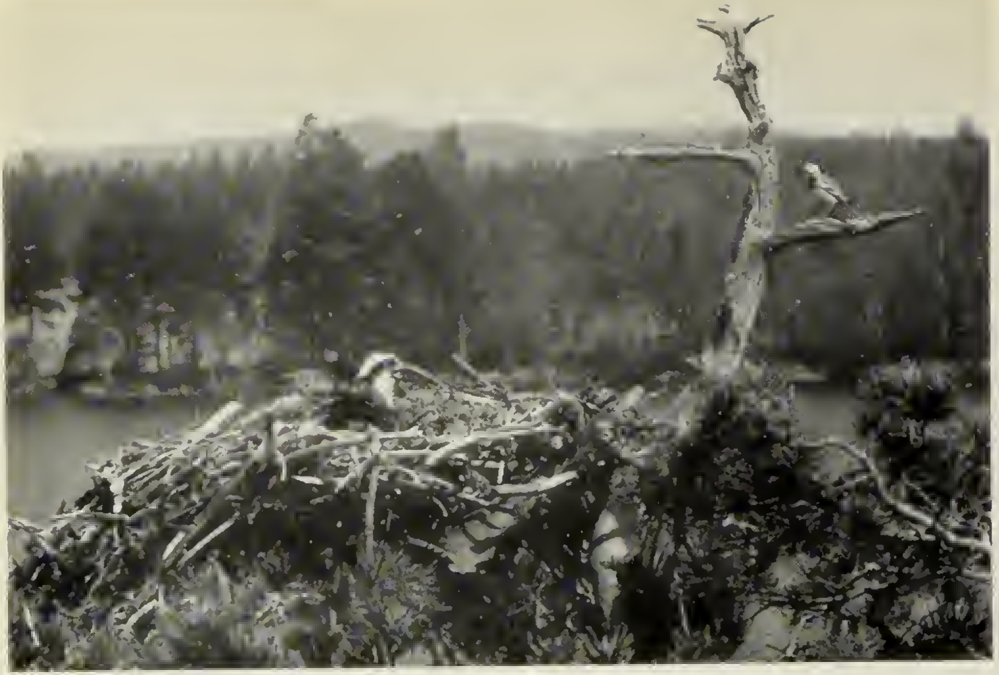
At this nest the male not only covered the eggs when the female was fishing, but also took a large and regular share in incubation; often on these occasions the female would perch above, as here, for perhaps a quarter of an hour, having a thorough preen and uttering all the while a soft, querulous, chirrupping version of the "kew-kew-kew" note (see page 490).



M. D. England

PAIR OF OSPREYS (*Pandion haliaetus*) AT NEST: SWEDEN, 1955

As with other raptors, the male brings food to the incubating female and also provides much of the prey until the young are half-grown; here, the female, on the left, is grasping a bream—one of their favourite species of fish—just brought by the male. This shows well the contrast between the dark upper-parts and pectoral band and the white underneath; also the white feathering on the legs (see page 490).

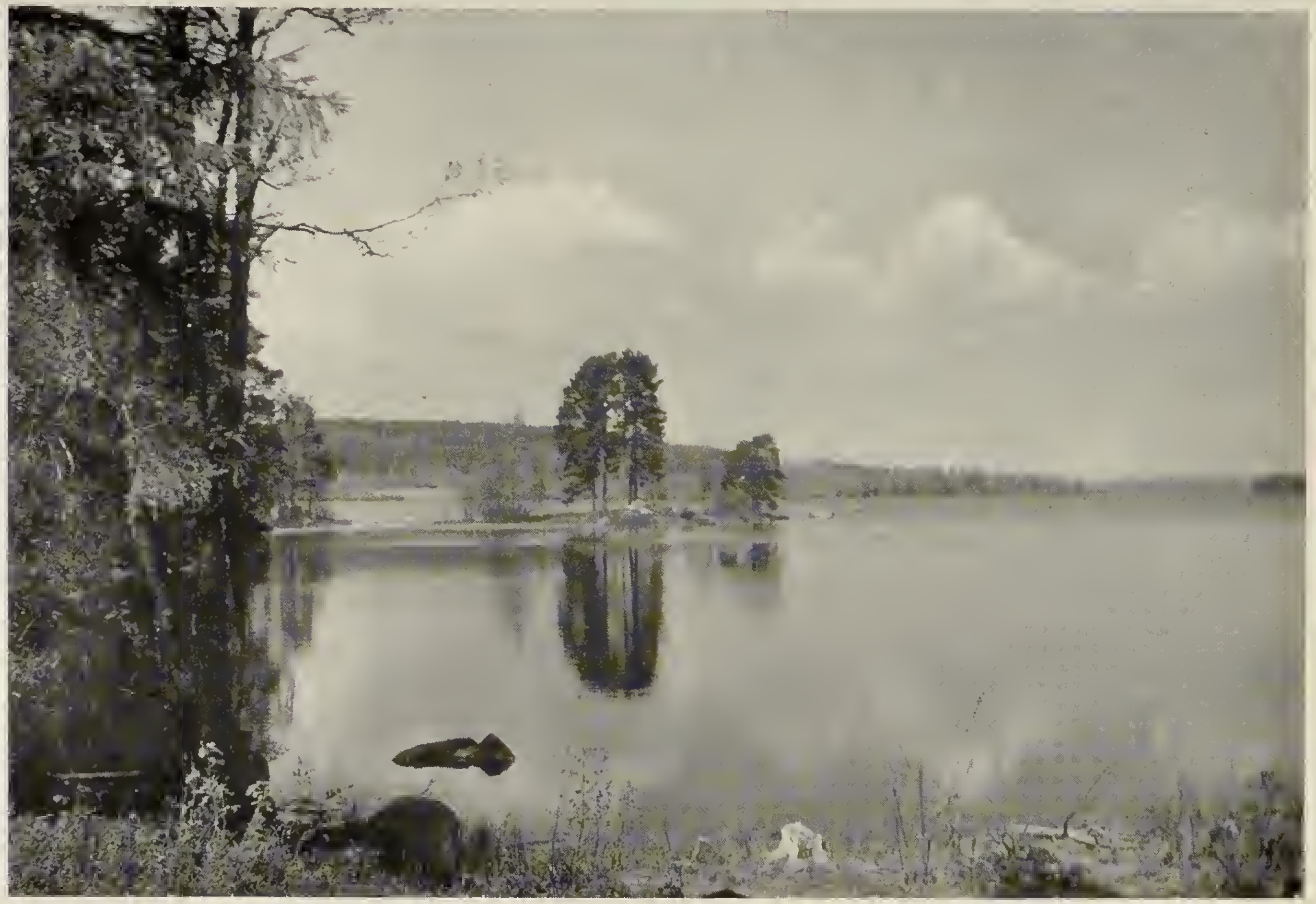


M. D. England

Male Osprey (*Pandion haliaetus*) on nest: Sweden, 1955
On the right can be seen a White Wagtail (*Motacilla alba*) which was breeding in the base of the Osprey's nest—a common occurrence, particularly with a nest that has been used for some years (though in this case the wagtail took up residence in the first season).

M. D. England

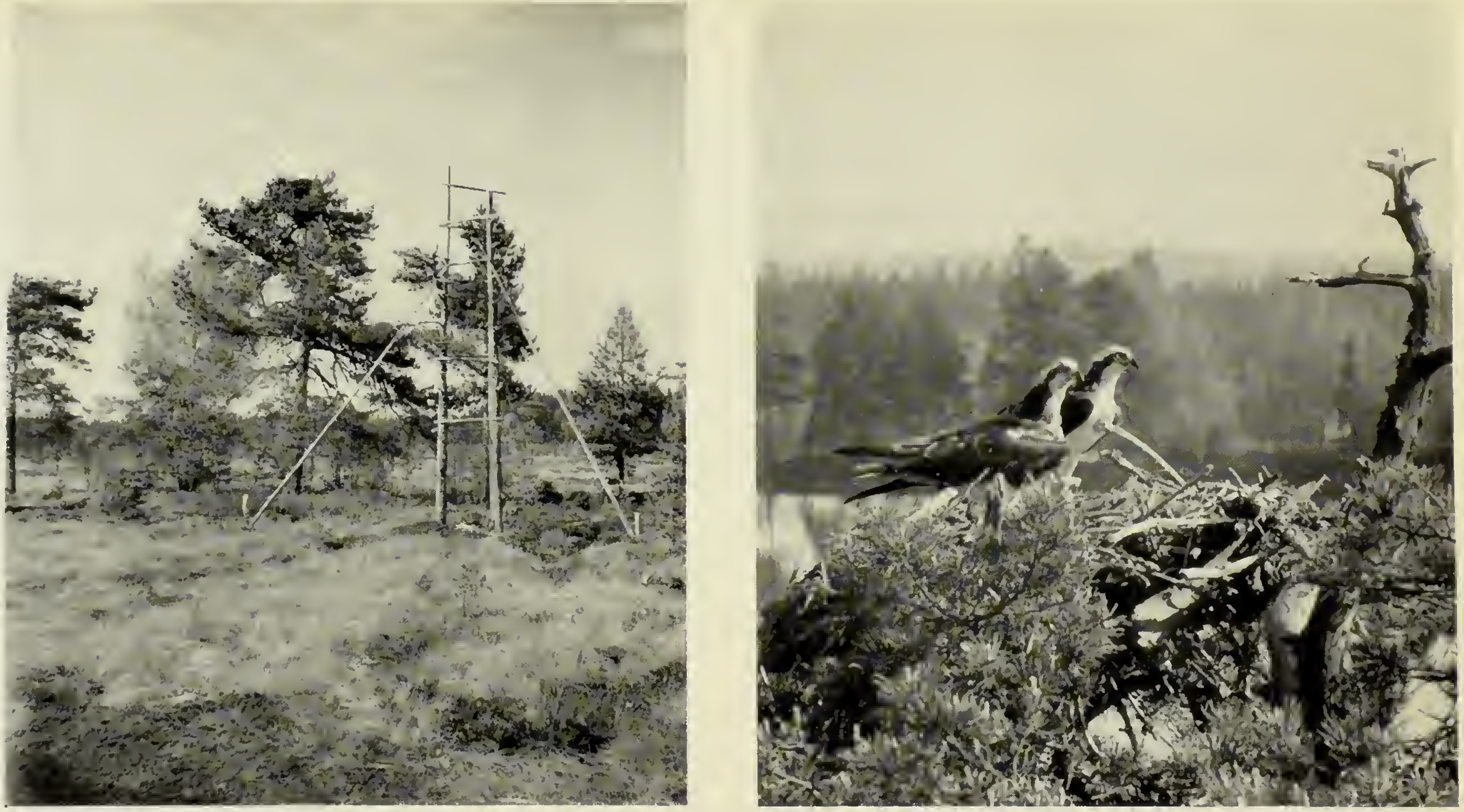
The hide used for photographing the Ospreys (*Pandion haliaetus*)
The right-hand arrow points to the hide and the other to the nest, in two pines 37 feet apart: the trees were at the end of a wooded spit jutting out into the lake shown on plate 71.



M. D. England

Breeding-habitat of Ospreys (*Pandion haliaetus*): Sweden, 1955

A typical Swedish lake, which is also typical of one type of Osprey habitat, though many nests may be considerable distances from any water whatsoever (see page 491 and plate 72, left). In other parts of the world nests may be on bushes, cliff-ledges, rocks or even on the flat ground (usually shingle or sand).



M. D. England

NESTS OF OSPREYS (*Pandion haliaetus*): CENTRAL SWEDEN, 1955

The arrow in the left-hand photograph shows the position of another Osprey's nest well away from open water, with a half-constructed hide in the foreground: the tree was the only one of any size in the area and stood in the middle of a vast marsh dotted with low trees and bushes; except in 1954, this nest has been

PHOTOGRAPHIC STUDIES OF SOME LESS FAMILIAR BIRDS

LXXVI. OSPREY

Photographed by M. D. England

(Plates 65-72)

Like a number of the birds of prey, the Osprey (*Pandion haliaetus*) is a widespread species and has a breeding-range which extends from Alaska in the north-west to Australia in the south-east. It is, however, mainly a bird of the northern hemisphere: *P. h. carolinensis* and *ridgwayi* are found in North and Central America respectively; and, on this side of the Atlantic, the typical race breeds in Spain, Morocco, Algeria, Tunisia and some of the Mediterranean islands, and from Scandinavia, Germany, the eastern Balkans and Turkey across Russia and Siberia to Kamchatka, Japan and China. The Australian form (*cristatus*) nests in Australia and the East Indies. (Other races have been described from New Caledonia, Manchuria and southern China, etc., but the four named above are the most widespread forms and account for by far the greatest part of the bird's range.) In winter there is a general movement southward from North America to Central America, and from Europe and the northern half of Asia to Africa, India and the Burma/Malay peninsula.

At one time the Osprey was a reasonably widespread summer-resident in Scotland, but by the end of the nineteenth century it was reduced to two or three localities and the last of these, Loch Arkaig, was last used as a breeding-place in 1908. A part of the sad story of this decline and an account of some of the villains involved are given, for example, by Dr. F. Fraser Darling in his *Natural History in the Highlands and Islands* (1947, pp. 246-247). Bearing this in mind, it is most unfortunate, to say the least, that it has been so widely disclosed that Ospreys have again been attempting to nest in Scotland, two nests being built in 1955 and again in 1956: the treatment and publicity (on the wireless and in the press) that these birds have received, in spite of valiant attempts at protection, is a sad exhibition of irresponsibility. And it is to be hoped that, should any return another year, they will be accorded the peace and quiet they need. Fuller information on the present status of the Osprey in Britain will be given in a forthcoming review of the distribution of Britain's rarer birds of prey.

S. Österlof (1951, *Vår Fågelvärld,* vol. 10, pp. 1-15) gives a most interesting analysis of the recoveries of 236 (13%) of the 1,805 Ospreys ringed in Sweden up to that time, showing differences in the migration routes taken by old and young birds. He also points out that in Europe the majority of Ospreys are in Sweden and N. Finland—which is still true though recently they have been spreading or regaining ground in S. Norway, a fact that is of interest in connection with the return to Scotland. It was in central Sweden in 1954 and 1955 that Mr. England's fine series of photographs of these magnificent birds was obtained. Plate 65 shows the whitish head (the rear crown-feathers forming a slight crest) with the broad, black band through the eye and down the side of the neck, joining the blackish-brown upper-parts. It is, however, the contrast (plates 68 and 69) between the upper-parts and the snow-white under-parts, the latter marked only by a broad, dark band across the breast, that distinguishes this species at once from all other comparable birds of prey. The males are a little purer white below, clearer brown above and average a little smaller than the females; immatures have a light speckling on the upper-parts, and the breast band narrower and much less distinct. Plates 65-69 also give a good impression of the rather long, white-feathered legs.

Nearly two feet in length and thus about the size of a Buzzard (*Buteo buteo*), but more powerful, of heavier build, and with strikingly longer and narrower wings which are sharply angled in flight, an Osprey is a majestic sight as it glides across the water, hovers for a few seconds with its legs hanging down, then plunges feet first, sometimes submerging entirely. It is searching for the fish (bream, trout, roach, perch, etc.) that form its staple food and indeed almost its only food in many areas, though individuals will occasionally take small mammals, amphibians and wounded or young birds. Fish up to "about 4 lb. in weight" (*Handbook*) are said to be taken, but as a good-sized female Osprey probably does not weigh any more than that—J. B. Szczepski in his *Pomocnize Tabele Ornitologiczne* (1953, p. 68) gives the weight of males as ranging from 1,300 gm. (about 2 lb. 14 oz.) to 1,740 gm. (about 3 lb. 13 oz.), and of a single female as 1,900 gm. (about 4 lb. 3 oz.)—it seems probable that such a load can be carried only under the very best conditions. The prey is usually carried in both feet and as the bird comes in to land it disengages its hinder foot (the fish is usually carried head first and the bird has one foot behind the other) and brings it forward to grasp the perch (C. G. Abbott, quoted in *The Handbook*). Plate 69 shows the female grasping a bream which has been brought to the nest by the male—as with many other birds of prey the male brings food to the incubating female on the nest and also provides the majority of the food during the first half of the 8-10 week fledging-period; during the five weeks of incubation, however, the female not infrequently goes fishing for herself, and the male—so Mr. England found—takes a very considerable and regular share in sitting on the eggs (plates 68 and 70, upper). Plate 71 shows a typical Swedish lake, the one where these photographs of the Ospreys were taken. It must be emphasized here, however, that though by the very nature of its food the species is bound to be associated with lakes, rivers or the coast it is a little unwise to lay too much emphasis on the proximity of water as an essential feature of the Osprey's habitat, for both resting-places and nesting-places may be considerable distances from any water and, in fact, the nest shown on plate 72 (left) comes into this category. Indeed, in the part of central Sweden where Mr. England was, only 2 out of 12 nests known were by water: most were deep in the forest and one was on a pine tree growing on a vast, boggy moor. The nests themselves, which are made basically of sticks and small branches, but which may include dead grasses, heather-stems, seaweed and almost any other material available, are often used for many years and thus attain a vast size as fresh material is continually added. Mr. England was told that the nest shown on plate 72 (left) was used without a break from 1933 to 1953 (and probably for many years before) and again in 1955 and 1956. In these circumstances it is not surprising that such birds as Tree Sparrows (*Passer montanus*) and White Wagtails (*Motacilla alba*) not infrequently build in the base of the conglomerated mass—and indeed plate 70 (upper) shows the White Wagtail which was breeding in this particular Osprey's nest. Mr. England was also told in Sweden that, unlike many birds, Ospreys do not necessarily completely desert a robbed or disturbed nest but will return to it to sit intermittently or just to stand for considerable periods; they will sometimes also start to build a new nest quite late in the season, though he has no evidence of a second clutch being laid.

The nest-site varies enormously in different habitats and in different parts of the species' range, but Mr. England found that in Sweden the tree-nesting birds appear to favour particular types of tree, usually among the tallest in the vicinity and almost invariably having a dead or bare portion at or near the top (as in these plates)—possibly these same features are applicable in other parts of the world and, for example, G. P. Dementiev, in *The Birds of the Soviet Union,* says that the vast majority of nests in Russia and Siberia are on tall trees (and that cliff-breeding is very rare). In some parts of the range, however, quite small trees and even bushes are used, and, in other areas still, cliff-ledges, rocks or even the flat ground (usually shingle or sand) of small islets. In the last connection it is of interest to read the account by J. C. Cowley (*Oologists' Record,* vol. 27, pp. 23-24, 41-45, 55-59) describing nests in the Red Sea area where the majority were in such sites; the bird is common there and several may be seen sitting on their ground nests from any one vantage point. Cowley also found what appeared to be a nest on an oil-derrick, and artificial sites like that have been recorded in other places. For example, though trees are usually used in Scandinavia, G. Ström (*Vår Fågelvärld,* vol. 13, pp. 271-274) gives photographs and descriptions of nests on the tops of power-line masts in Västergötland;—four such nests have been found, the first in 1945, and the birds have continued to breed there, but it is thought that only two pairs are involved. In the same journal (*loc. cit.*) Holger Viberg describes (with photograph) the nest of a pair which has bred for some years on the top of a little rock in Lake Storejen, Dalicarlia. In America, small buildings are regularly used in some areas—for example, huts on Gardiner's island—and in at least one district telegraph poles have been taken over (*per* M. D. England).

The American race (*P. h. carolinensis*) is a social bird and nests in loose colonies, of even as many as 30 pairs, on trees or sometimes on the ground. Colonial nesting is much less well-developed in the European and Asian form (*P. h. haliaetus*) and, though in a few areas like the Red Sea nests may be quite close together, as we have seen, and in others—for example, locally in Germany—there may be places where nests are only a quarter of a mile apart, over much of the Palaearctic each pair is quite separate: this apparently holds good throughout the U.S.S.R., for G. P. Dementiev (*op. cit.*) states that, although the bird is common in parts, nesting pairs are usually at a great distance from each other. Yet it seems that the territorial sense is not strongly developed for Mr. England tells us that he has found that Ospreys fish over a wide area, not necessarily restricting themselves to the "home" lake, and that a breeding pair does not seem seriously to resent a stranger fishing on their lake.

When the young leave the nest, there is, as with other birds of prey, a period of apprenticeship when they learn by imitation to follow the adults' feeding-methods. R. Meinertzhagen (1954, *Ibis*, vol. 96, pp. 153-155) gives a very interesting account of such an "education" of two young: during a total time of 6 days they were first of all encouraged to leave the nest by having no food brought until hunger forced them to follow one of the parents holding a fish; and then they learnt to hover, dive and catch fish for themselves by imitating the adults who would drop fish they were carrying and catch them again just above the water-level. I.J.F.-L.

OBITUARY

A. W. P. ROBERTSON (1908-1956)

COMMANDER Alexander William Parrish Robertson, R.N. (Retd)., died on 13th June, 1956. Born at Harlow, Essex, in August 1908 and educated at Harrow, he entered the Royal Navy in 1926 and served in China, the Mediterranean and Australia, followed by service as House Officer, Royal Naval College, Dartmouth. Robertson took part in Channel convoys, and from 1945 to 1947 was Comptroller to H.R.H. The Duke of Gloucester, Governor-General, Australia. Until his retirement, medically unfit, in 1949, he was 1st Lieutenant, H.M.S. Ganges, Shotley.

His interest in ornithology and bird-photography dated from his early schooldays, and retirement enabled him to devote much of his time to these pursuits.

As an ornithologist, he was a most careful and critical observer. He studied intensively the birds of East Anglia, in particular the typical species of Breckland. At the time of his death, he was engaged on a monograph of the Crossbill, on which he was the acknowledged authority in Britain.

Robertson was a member of the British Ornithologists' Union, of the British Trust for Ornithology, and a Member of Council of the Royal Society for the Protection of Birds.

Bird-photography he regarded as a magnificent field-sport as well as a means of illustrating his meticulous field-notes. It was his deep conviction that anyone attempting bird-photography without an adequate knowledge of birds generally, and a good working knowledge of the particular bird being dealt with, is a menace, and that it is a plain duty to learn everything one can about a bird's field-habits before attempting to photograph it. For him, the bird always came first; his careful preparations and subsequent technique were above criticism and an example to those who were privileged to be initiated by him.

He was a Member of Council of the Zoological Photographic Society. Of his large output, his photographs of Hawfinch, Tree Sparrow, Stock Dove, Tufted Duck, Little Grebe and Stone Curlew are among his best, and a number have been selected for inclusion in the National Collection under the auspices of the Nature Conservancy.

Many of his photographs were used to illustrate his books, of which he wrote four. *Bird Watching Days* (London, 1938), written in collaboration with R. D. Powell, is a delightful account of his early experiences. *Birds Wild and Free* (London, 1950) deals largely with bird life in Cheshire and East Anglia. *Bird Pageant* (London, 1954), sub-titled "Field Studies of Some East Anglian Birds", is a detailed record of his observations of a number of species that particularly interested him, and a valuable contribution to the literature of both ornithology and Breckland. His last book, *A Partridge Year* (London, 1956), written in collaboration with Esmond Lynn-Allen, was completed only a short while before his death and he did not live to see its recent publication.

In addition to his books, he contributed many notes or articles to *British Birds* and other publications.

A charming, unassuming, kindly personality, with a delightful sense of humour, Alec Robertson will be sadly missed by a wide circle of friends, and in those organizations where his experience and counsel were so highly valued. S.C.P.

[We should like to endorse S.C.P.'s tribute to Alec Robertson's approach to bird-photography as a magnificent field-sport in which the welfare of the birds was his prime concern. He was indeed a model to other photographers and just before his sad and untimely death he wrote for us the answer to the criticism which we now publish on pages 509-511.—EDS.]

THE FOOD OF NESTLING PURPLE HERONS IN HOLLAND

By D. F. Owen and G. C. Phillips

FEEDING HABITS AND AREAS STUDIED

In late June 1956 we visited two colonies of Purple Herons (*Ardea purpurea*) in Holland in order to observe feeding and other behaviour for comparison with our studies in England of the Common Heron (*A. cinerea*). The colonies visited were at the Naardermeer reserve (10 miles S.E. of Amsterdam) and at Nieuwkoop (15 miles S.W. of the Naardermeer). At the Naardermeer we were told that there were over 150 pairs of Purple Herons nesting in 1956 and at Nieuwkoop at least 200 pairs, where they bred for the first time as recently as 1946. We spent a week watching the adult birds feeding, and in addition, collected 56 food-samples from the young at the Naardermeer and 17 from those at Nieuwkoop. All food-samples were collected in the last week of June, and thus the results given in this paper refer only to that period. There can be little doubt that the food of the nestlings varies with the time of year and also from year to year. This paper describes what we found in the food-samples and includes a few notes on the behaviour of nestlings and adults.

The Naardermeer consists of a series of lakes connected together by waterways and surrounded by extensive reed-beds (mostly *Phragmites* sp.) and fen scrub chiefly alder, birch and sallow. There were two groups of nesting Purple Herons, the main one in a *Phragmites* marsh, and a small one of 30 pairs (the group we studied) in sallow bushes at the edge of an area of fen scrub. All the nests in this latter group were less than 10 feet and most were only 3-5 feet above the ground. At the Naardermeer many adult Purple Herons were seen hunting for food along the numerous narrow canals and in pools surrounded by reeds. Others were seen hunting along the edges of ditches outside the reserve, but our observations did not suggest that the birds regularly travelled more than a few miles from the heronry for food.

In many respects Nieuwkoop is similar to the Naardermeer, but it is larger, and much of it is open to the public (unlike the Naardemeer). Here the Purple Herons nest in an alder wood, though considerable numbers also nest in sallows near-by. The alders varied in height from 6 to 20 feet. At Nieuwkoop many of the adult Purple Herons seemed to fly considerable distances for food, but we do not know to what type of habitat. In addition, many birds were also seen feeding in the canals and among the reeds, just as at the Naardermeer. At this colony a few pairs of Common Herons nest with the Purple Herons, and Little Bitterns (*Ixobrychus minutus*) and Bitterns (*Botaurus stellaris*) are evidently quite common in the area. At the Naardermeer the only other breeding heron is the Bittern, but numbers of Common Herons visit the Cormorant (*Phalacrocorax carbo*) colony where they scavenge regurgitated food.

In Holland all our observations of adult Purple Herons suggested that they fed singly, though often several individuals could be seen in quite a small area. They seemed to feed closer together than Common Herons in England, but this might be due to the greater concentration of breeding pairs in the area and the rich feeding-grounds. In the Camargue, one of us (D.F.O.) has watched Purple Herons feeding and here also they were always solitary, quite unlike the Little Egrets (*Egretta garzetta*) and Night Herons (*Nycticorax nycticorax*) which are distinctly social.

METHODS OF OBTAINING FOOD SAMPLES AND THE BEHAVIOUR OF NESTLINGS WHEN ALARMED

Young Purple Herons, like many other fish-eating birds, readily regurgitate food when alarmed, and this is a useful means of studying the food of such species—see Van Dobben (1952) for the Cormorant, and Owen (1955) for the Common Heron. Probably the birds regurgitate to scare or to divert the attention of their enemies, and, possibly, once relieved of food they are able to escape from the nest more easily. Using this method of obtaining food-samples it is not easy to get food from nestlings less than 10 days old, but some samples were collected from small young by gently massaging the stomach region soon after they had been fed. All the items of prey found in the food-samples were identified on the spot and left in the nest where they were eaten again by the nestlings. Samples were collected from about 50 different nests, some nests being visited more than once. At the Naardermeer all the samples were collected in the early morning and in the evening, at which times there appeared to be a peak of feeding-activity (as in the Common Heron in England).

We found that young Purple Herons regurgitated more readily than Common Herons, and rarely attacked the observer, unlike Common Herons which normally attack. There was also a greater tendency to leave the nest and plunge into the undergrowth: even quite small young of about two weeks old would leave the nest when alarmed. Hanzák (1949-50) reported that in Czechoslovakia young Purple Herons 8-10 days old readily left the nest when alarmed and returned later. Related to these differences of behaviour between the two species of heron, it might be mentioned that the nest of the Common Heron is considerably enlarged and made more cup-shaped during the incubation-period and when the young are still small. When the eggs are laid the nest is flat, but by the time they hatch it is distinctly cup-shaped. This seems to serve the function of keeping small young in the nest. We found that the nests of the Purple Heron were much smaller than those of the Common Heron and there was hardly any sign that the nest had been built up during incubation. This is probably related to the fact that the young Purple Herons leave the nest when disturbed and any building up of the nest might tend to prevent them from doing this as efficiently as they do.

SIZE OF PREY

We estimated by eye the length of most of the fish found in samples and found that, like the Common Heron, the Purple Heron catches fish selectively, fish of 110-200 mm. (*ca.* 4-8 inches) in length being much more numerous than either smaller or larger individuals. The size of fish taken by the Purple Heron in Holland was very similar to that taken by the Common Heron in England (Owen, 1955). This is of particular interest as smaller fish must have been more numerous than larger fish of the same species. All eels taken were larger than 150 mm. (6 inches) and smaller than 400 mm. (16 inches)., suggesting that these fish were also being taken selectively. We could find no evidence of adult Purple Herons bringing smaller prey for the small young.

Once, at Nieuwkoop, we found a pike 350 mm. (14 inches) long and a rudd 240 mm. (9½ inches) long in the bottom of a nest containing three young about two weeks old. Obviously these fish were much too large for the young birds to swallow and they had been rejected. Adult Common Herons almost always partly digest a large fish before giving it in pieces to small young, and presumably this normally happens in the Purple Heron.

As the prey found in the food samples varied considerably in size

TABLE I—LARGE PREY IN FOOD-SAMPLES FROM NESTLING PURPLE HERONS (*Ardea purpurea*) IN HOLLAND, JUNE 1956

	Naardermeer (56 samples)	Nieuwkoop (17 samples)
Pike (*Esox lucius*)	12	3
Carp (*Cyprinus carpio*)	1	—
Gudgeon (*Gobio gobio*)	—	2
Tench (*Tinca tinca*)	7	2
Rudd (*Scardinius erythrophthalmus*)*	42	16
Bream (*Abramis brama*)	9	—
Eel (*Anguilla anguilla*)	9	1
Perch (*Perca fluviatilis*)	10	13
Ruffe (*Acerina cernua*)	—	2
Burbot (*Lota vulgaris*)	2	—
Water Vole (*Arvicola amphibius*) (adults)	14	7
,, ,, ,, ,, (young)	28	1
Mole (*Talpa europaea*)	10	1
Shrew (*Sorex* sp.)	—	1
Frog (*Rana* sp., mostly *temporaria*)*	8	2
Skylark (*Alauda arvensis*) (young)	1	—
TOTAL	153	51

*Note: " Rudd" may also include Roach (*Rutilus rutilus*), and a few of the frogs may have been *Rana esculenta*.

it would be misleading to compare directly the numbers of each species without making some allowance for size. This difficulty has been partly overcome by dividing the prey into two categories:

Large prey. All eels more than 150 mm. (6 inches) long, all other fish more than 100 mm. (4 inches) long and all mammals and birds. Within this category there was some variation in size, but it is not so great as to give misleading results.

Small prey. This includes all fish smaller than the above and all insects, but very few small prey were found in the food samples collected from the nestling Purple Herons.

SPECIES TAKEN

Most species of prey found in the food-samples were easily recognisable in the field, the greatest difficulty being experienced with the closely related rudd and roach. All fish in good condition which might have been either of these species were found on close examination to be rudd, and it therefore seems likely that most were of this species.

Naardermeer.

Table I shows the large prey found in the food-samples collected at the Naardermeer. A total of 153 items of prey were identified, almost entirely fish and mammals. The commonest species were rudd (27%) and water voles (27%). Many young water voles were taken, and often it seemed that a nest of these mammals had been found by the adult Purple Heron, as a sample would contain one adult water vole and several young. Adult Purple Herons were often seen feeding along the edges of ditches and doubtless this would frequently lead to the discovery of a nest. Besides rudd, other species of fish found rather frequently in the samples included pike, eel, bream and perch, all of which would be common in the immediate vicinity of the heronry. Purple Herons were sometimes seen feeding in open fields and this would account for the moles present in the samples. Frogs were numerous in the Naardermeer and probably very available to adult Purple Herons. The single

TABLE II—SMALL PREY IN THE FOOD-SAMPLES FROM NESTLING PURPLE HERONS (*Ardea purpurea*) IN HOLLAND, JUNE 1956

	Naardermeer (56 samples)	Nieuwkoop (17 samples)
Ten-spined Stickleback (*Pygosteus pungitius*)	6	—
Perch (*Perca fluviatilis*)	3	—
Rudd (*Scardinius erythrophthalmus*)	3	—
Tench (*Tinca tinca*)	—	1
Water beetle larvae (*Dytiscus* sp.)	27	—
TOTAL	39	1

bird found in a sample was an almost fledged Skylark (*Alauda arvensis*). Possibly a nest had been found by the Purple Heron when hunting for mammals in a field.

Table II shows the small prey in the Naardermeer food-samples. We were surprised to find so few insects, especially in view of the fact that other writers give the impression that the Purple Heron takes many insects. A possible reason for this is discussed later. As we have already found in the Common Heron, few small fish of the larger species were taken, and there was a surprising scarcity of such species as sticklebacks.

Nieuwkoop.

We collected only 17 samples from this colony, all on the same day. Table I shows that the large prey taken were of much the same species as at the Naardermeer. There were fewer water voles and rather more perch, but possibly these differences would not have been apparent had more samples been collected. The presence of gudgeon perhaps suggests feeding in rather faster flowing water. Except for one small tench, no small prey were found in the samples from Nieuwkoop (Table II).

DISCUSSION

The complete absence of dragonflies and their larvae is of interest, as at both localities these insects were abundant, but as already mentioned, there was a general scarcity of small prey in samples. We have compared our results from Holland with the results of other workers in different countries (Moltoni, 1936, 1948, for Italy; Vasvári, 1930, for Hungary; Madon, 1935, for France). Most of the above workers used stomach contents, not regurgitated food from nestlings. The chief difference (apart from different species of prey due to locality) was that the stomachs contained many more insects than we found in the regurgitated food. This might be due to the fact that more insects were taken, but it also might be due to the slow rate of digestion of insect remains in a heron's stomach. This means that any analysis of stomach contents gives an over-emphasis on the insect part of the diet. To get over this difficulty only fresh undigested food must be counted and all fragments of insects and mammal fur must be ignored. The three authors quoted above did not make allowance for the different rates of digestion, as we have in the present study.

At both the Naardermeer and at Nieuwkoop many young Purple Herons were found dead in the nest. Often in a brood of four the smallest was dead, and sometimes two out of four young had died. Such mortality strongly suggests food shortage. In some newly-hatched broods all four young were alive, but in every brood more than 14 days old there were only three young or less. We did not see a single brood of five. Work in progress in England on the Common Heron shows that in years when food is readily available broods of four may be 100% successful, but in poor years up to 40% of the young in a colony may die of starvation, the smallest birds in a brood always dying first. The few facts we have for the Purple Heron in Holland suggest that 1956 was a moderately bad year for the availabilty of food, but possibly other factors were involved, such as cold and heavy storms.

The Purple Heron is a summer migrant to Holland and breeds later than the Common Heron. Precise figures are not available, but the difference in breeding-season appears to be 4-6 weeks. Thus, by the time most of the young Purple Herons are half-grown and are needing most food, almost all the young Common Herons will have already left the nest. Certain prey taken by Purple Herons for their young, such as young water voles, would not be available to nestling Common Herons, but possibly a more important difference in the ecology of these two closely related species is that the Purple Heron feeds much more in cover and at small stretches of water, whereas the Common Heron is much more a bird of open country.

ACKNOWLEDGEMENTS

We must express our thanks to J. F. Burton and D. F. Dorward for help with the field work in Holland, and also to the *Vereeniging tot behoud van Natuurmonumenten in Nederland* and to Mr. O. P. N. Blom for permission to work at the Naardermeer and at Nieuwkoop, respectively.

SUMMARY

1. The feeding habits of adult Purple Herons and the behaviour of nestlings are briefly described.

2. Adult Purple Herons select food between certain size limits for their young, avoiding both very small and very large prey.

3. The food brought to the young at two colonies in Holland in late June 1956 comprised chiefly freshwater fish and mammals. Few insects and other small prey were found.

4. The feeding ecology of the Purple Heron is compared with that of the Common Heron.

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NOTES

Albinism related to age.—With reference to notes on this subject (*antea,* vol. xlvii, p. 406; vol. xlix, p. 153), I have come across a similar case, also with a male Blackbird (*Turdus merula).* The bird was ringed at Burgess Hill, Sussex, on 13th December 1954, as a normal first-winter cock. When it was retrapped on 29th June 1956, the head and neck were mixed white and off-white; there were also a few white feathers on wings and body. It will be seen that the bird was of no great age when the albinism developed. J. ANTHONY WIGZELL

Albinism related to age.—With reference to Mr. R. M. Band's note (*antea,* vol. xlix, pp. 153-154) on the development of white patches in the plumage of an ageing Blackbird (*Turdus merula*), the following record may be of interest.

An adult male Blackbird was colour-ringed at Hutton, Essex, on 9th December 1950. Its plumage was then normal. The same bird was seen at intervals until 23rd March 1951, after which it was not seen again until 14th October of the same year, when it reappeared with its left outer-most secondary quite white. From then, until it was killed by a cat in December 1954, it was seen frequently, but it always retained a white feather in its wing. K. G. FOOTT

Albinism related to age.—Progressive albinism in Blackbirds (*Turdus merula*), as described by R. M. Band (*antea,* pp. 153-154), is not, I think, outstandingly remarkable. In 1952, a scrutiny of county bird-books and regional reports enabled me to find eight records of pied birds becoming whiter as the years went by, and since then, without deliberate search, I have come across two others. Against these ten, I have located only a single instance of a pied bird said to be getting gradually darker. I collected altogether 193 records of pied individuals, of which 37 were explicitly stated to be only white-headed, suggesting that, as a rule, in cases of progressive albinism, the head is the first part to lose normal pigment.

With Pheasants (*Phasianus colchicus*), the Marquess Hachisuka ("Variations among Birds", *Supp. Pub. XII, Orn. Soc. Japan,* 1928) found that in variegated specimens the head turns white first, then the primaries, then the tail and back, and finally the underparts. In some cases the wing-coverts are the last to change.

K. G. SPENCER

Albinism related to age. — With reference to the notes on albinism related to age (*antea,* vol. xlvii, p. 406; vol. xlix, pp. 153-154), the following may be of interest.

An almost total albino Oystercatcher (*Haematopus ostralegus*) has wintered in Langstone Harbour, Hampshire, each year since 1951, also occasionally visiting Chichester Harbour, Sussex. When first seen in Langstone Harbour, the bird was entirely white apart from narrowly black-tipped primaries and tail-feathers. During each subsequent winter it has been noticed that the black has extended further back along the primaries to the tips of the outer secondaries, and the narrow terminal band has increased in width. In the winter of 1955-56 it was seen for the first time that the coverts were speckled with black.

This bird is probably the same one as that reported from Chichester Harbour in the *Sussex Bird Report* for 1948, when it was described as being an "albino except for rather dark wing-tips". D. F. BILLETT

Feeding association between Coot and Little Grebe.—On 21st January 1956, at about 15.00 hours, we were watching Coot (*Fulica atra*) on the Queen's Pool in Blenheim Park, Oxfordshire. There were over a hundred Coot on the pool, most of them feeding actively, and there were also about ten Little Grebes (*Podiceps ruficollis*) in the same area. Our attention was attracted by the sight of a Little Grebe persistently following a Coot which was feeding at a place where the weed was evidently very close to the surface. We then looked more closely at the other Little Grebes on the pool, and soon realized that most of the ones which were in shallow water were in attendance on Coot. There were, however, about five which were feeding in what appeared to be deeper water and these were quite independent of Coot. Where two birds were feeding together the Little Grebe would spend most of its time within about two feet of the Coot, and would always dive just after the Coot had done so. It would also dive at other times, but always it would dive towards the Coot or the place where the latter had disappeared. On several occasions a Little Grebe was seen to leave one Coot and swim straight to another, and once this appeared to be the result of the first Coot swimming into deeper water. At one time two Little Grebes were following the same Coot and on two occasions one of these grebes (not necessarily the same one) made an aggressive movement towards the other; on the second occasion the attacked bird swam off to another Coot.

The Handbook gives the food of the Coot as mainly vegetable matter obtained by diving, while the Little Grebe eats mainly animal food. It seems probable that the Little Grebes were in this case feeding on Crustacea or other small animals disturbed by the Coot. A feeding association between these species does not appear to have been recorded previously.

N. P. ASHMOLE, R. G. B. BROWN and N. TINBERGEN

Merlin in the North Atlantic.—At 3.30 p.m. (local time) on 2nd October 1955, with R.M.S. *Nieuw Amsterdam* at 19°W.51°N.—approximately 400 miles west of Ireland—I saw a female or juvenile male Merlin (*Falco columbarius*) flying strongly about the ship. It made occasional excursions low over the waves and was in almost continuous sight until dusk when I lost it. There was no evidence of its alighting. It was not seen the following day. For several days previously the weather had been calm and a close watch kept. D. H. WILKINSON

[It should perhaps be remembered that the Merlin breeds on both sides of the Atlantic; also that Kenneth Williamson has shown (*antea,* vol. xlvii, pp. 434-441) that Merlins from Iceland (*F. c. subaesalon*) are regular autumn migrants through Fair Isle, particularly in early October.—EDS.]

Lapwing chicks "pattering" and feeding on tadpoles. — From the time they were hatched at Lacock gravel-pit, Wiltshire, on 16th May 1956, I watched almost daily a family of four Lapwing (*Vanellus vanellus*) chicks. It was interesting to note that, even when less than a fortnight old, they used the "pattering" action in feeding, holding one leg slightly forward and vibrating the foot rapidly. This behaviour is habitual with adults, but not apparently recorded hitherto for chicks.

A pool which they frequented was swarming with tadpoles, which the chicks, from the age of a fortnight, regularly included in their diet, wading into the water and securing them with a quick stab of the bill; the prey was then beaten on the ground once or twice before being swallowed. Only one or two tadpoles were taken at any one time, although, as previously mentioned, they were present in very large numbers: if a bird so wished it could have gorged itself on them. I cannot trace, either in *The Handbook* or in K. G. Spencer's *The Lapwing in Britain,* any mention of tadpoles being taken either by adults or chicks.

G. L. BOYLE

[Mr. K. G. Spencer has kindly confirmed that he has no other records of either of these observations.—EDS.]

Exceptionally late Shore Larks in Norfolk.—On the evening of 16th June 1956, in company with George Bishop, Peter Marshall and Harry Martin, I was returning to the Great Yarmouth road from the north side of Breydon Water, Norfolk, when a male Shore Lark (*Eremophila alpestris*) rose a few inches from the long grass and ragwort almost at our feet. The bird appeared quite exhausted, making very little headway against a strong S.E. wind with driving rain, and dropped back almost at once into the grass. On moving forward to flush it again we disturbed three more Shore Larks in addition to the first bird, the four now fluttering weakly into the grass in the lee of the railway embankment.

On later consulting *The Handbook* I noted that the latest date previously recorded, also in Norfolk, was 29th May 1907.

E. L. ROBERTS

Swallow feeding on sand-hoppers.—Towards the close of the day on 4th August 1956, at Porthkidney, near Hayle, Cornwall, a straggling line of migrating Swallows (*Hirundo rustica*) was observed flying at a height of only a few feet above the incoming tide. One was seen to leave its companions and, coming close to the writer, commenced, whilst still in flight, to take small sand-hoppers (*Talitrus locustra*) from the surface of the partially dry sand. The bird also occasionally alighted on the beach and fed on any sand-hoppers near-by.

I have traced one other record of a Passerine feeding on these crustaceans: A. V. Cornish reported a Meadow Pipit (*Anthus pratensis*) doing so (*antea,* vol. xlv, p. 76). BERNARD KING

[On Camber beach, Sussex, it is normal and annual for migrating Sand Martins (*Riparia riparia*) to feed on sand-hoppers in this way.—N.F.T.]

Bigamy in Swallow.—In 1955 a colour-ringed male Swallow (*Hirundo rustica*) mated with two females (one colour-ringed), both of which nested at the same time, within four yards of each other, in an outbuilding of my house at Cley, Norfolk. The male ignored one brood from the time it hatched and the nestlings died when half-grown. The successful female disappeared after her brood had fledged, and the male and the "neglected" mate then co-operated in rearing a second brood.

In 1953, 1954 and 1956 this male Swallow behaved normally, having only one mate at a time. R. A. RICHARDSON

Juvenile Rook feeding another juvenile.—In mid-June 1956, I brought home a juvenile Rook (*Corvus frugilegus*) which was unable to fly, owing to a wing-deformity. One afternoon, a few days later, it was standing on the lawn where it was accustomed to have food thrown to it when a Rook of the year flew down and, in response to the begging calls and movements of the flightless bird, fed it twice. Although there are a number of records of young or apparently immature birds feeding young of their own species it is probably unusual for a juvenile to feed another away from the nesting-site or colony. EDWARD A. ARMSTRONG

Blackbird feeding brood of tits.—In April 1956 a pair of Blue Tits (*Parus caeruleus*) took possession of a nest-box in the garden of my house at Southgate, London. The box was of simple construction with a 1¼in. hole, a perch and a ledge, mounted on a post about 5 feet above ground level. The brood was hatched out about 30th April and left the nest on 22nd and 23rd May.

Early in May a cock Blackbird (*Turdus merula*) began regularly bringing food to the nest-box and was frequently seen standing on the perch with his head in the nest, apparently feeding the young birds. At first the parent birds showed every sign of agitation and alarm, but they gradually accepted the self-appointed foster-father and, on occasions when the Blackbird arrived while one or other of the parents was in the nest, were observed taking food from him. Later, when a young bird was seen clinging to the aperture inside the nest, the Blackbird fed it direct. On at least one occasion the Blackbird roosted at night on top of the nest-box. For a day or two after the nest was deserted the Blackbird continued to call with supplies, but then seemed to "realise" that there were no chicks at home and ceased to come.

In a jasmine bush near-by a Blackbird's nest had been savaged by a cat and there were indications that the hen bird had been killed. We suspect—but cannot be sure—that the cock Blackbird came from this nest and, transferring his attentions to the tits when his own nest was broken up, continued with the task of fetching food. J. H. CLEMENS

Pied Wagtail nesting in hedge.—On 31st July 1956, I found the nest of a Pied Wagtail (*Motacilla alba yarrellii*) in a thick rhododendron hedge at the Loughborough Corporation Waterworks, Leicestershire. It was placed in a fork about four feet six inches above ground level and contained four fully fledged young. These were a second brood, the first having been reared in an iron valve-box on the dam close to the hedge. Nothing resembling a hedge-situation is mentioned in *The Handbook*. E. L. ROBERTS

Chaffinches using same nest for two broods.—On 28th May 1956, the last of a brood of four Chaffinches (*Fringilla coelebs*), from a clutch of five, left a nest in honeysuckle on the supports of a house verandah at Arnside, Westmorland. On 25th June there were three half-feathered young in the same nest. The same hen Chaffinch, an exceptionally tame bird, was recognisably the mother of both broods. J. A. G. BARNES

[Happenings like those described by Mr. Barnes may be less uncommon than one might suppose among the finches, for at least two similar cases, involving Chaffinches, have been recorded in *British Birds* (vol. xl, p. 288); also one instance of a pair of Goldfinches (*Carduelis carduelis*) using the same nest for two broods (*antea*, vol. xxxviii, p. 99). It is perhaps worth drawing attention, too, to instances of Greenfinches (*Chloris chloris*) using their previous year's nest (vol. xlii, pp. 327-328), or adapting the disused nests of Chaffinch (vol. xxxix, p. 276) and Bullfinch (*Pyrrhula pyrrhula*) (vol. xxxvii, p. 134).—EDS.]

REVIEW

THE ORNITHOLOGISTS' GUIDE. Edited by Major-General H. P. W. HUTSON, C.B., D.S.O., O.B.E., M.C. (Published by British Ornithologists' Union and distributed by H. F. & G. Witherby, Ltd., London, 1956). 268 pages. 21/-, postage 1/6.

MANY ornithologists who spend much of their time abroad have access to little literature and may not know how to use their opportunities fully nor how, where or whether to publish knowledge they acquire. The purpose of this handbook is to meet this situation and to encourage the study of birds by pointing out where worthwhile opportunities exist. The bulk of the book consists of 54 short articles, averaging 4 pages each, written by a panel of 44 experts, mainly British but including workers in Africa, Australia and America. The range of subjects is remarkably wide: classification, plumage, field-identification, parasites and collecting of all sorts; geographical aspects including range, migration, navigation, birds at sea, in the Tropics, in the Arctic, etc.; general behaviour (learning, food, predation, calls, roosting, associations, etc.), 5 articles on aspects of breeding, 4 on conservation, and 20 on study techniques including photography, automatic recorders, ringing, censuses, aviculture. Finally there are suggestions for special study, and regional information for the whole world excluding Europe, U.S.S.R. and North America. The regional information given is:—

Societies and other bodies concerned with ornithology.
Public and private ornithological collections and bird-sanctuaries.
Individual ornithologists (in those areas where the state of organised ornithology makes this information desirable).
Reference-books and check-lists..

The articles are of course brief—in fact the question of field-description is not taken much further than making sketches—but most of them cover a great deal of ground; some are rather generalized, others give considerable detail. To illustrate points, examples are largely drawn from non-European species. While very modern in outlook and up-to-date in information, emphasis is mainly on gaps in our knowledge and on steps that may be taken to fill them. Thus, although the overseas observer has everywhere been the reader particularly in mind, this informative book also provides the ornithologist in this country with a broad outline, a glimpse of recent developments and a variety of suggestions for advancing knowledge, extending over so wide a field of subjects of bird-study as must surely cater for all tastes. No one who is wondering how to turn his bird-watching to useful account should fail to consult this book. It will of course date in time, but the speed with which it does so may be a measure of its success.

P.A.D.H.

LETTERS

THE INTERPRETATION OF VARIATION AMONG THE YELLOW WAGTAILS

SIRS,— May I ask a little of your space in which to comment on some points in Dr. Mayr's summing-up (*antea*, pp. 115-119) of our present state of knowledge of the Yellow Wagtail (*Motacilla flava*) complex? It is, as you say in your footnote (p. 118)), a sobering discussion, and I do not take it in the least ill if "drunk and disorderly" conduct on my part is gently implied!

The conclusion is inescapable that little further progress towards solving our Yellow Wagtail problem can be made without critical field-studies on the inter-relationship of the various forms in areas where overlap occurs. Your suggestion that here is a specific field for active co-operation between western and Soviet ornithologists is imaginative and deserves to prosper.

Meanwhile, there are two fields in which western ornithologists themselves can work towards a solution of the problem. The first is a qualitative analysis of the characters of the breeding populations in such key areas as the Camargue—and the hybrid zone of *flava - iberiae - cinereocapilla* in general—and those districts in northern France and the Low Countries where *flavissima* nests alongside, or close to, *flava.* An excellent study of this type is the recent one by Sammalisto (1956). The second is a more critical appraisal of the distribution, and particularly the habitats, of the several forms on their winter grounds in Africa. The importance of this is great. Factors of the winter environment unquestionably play a strong part in the evolution of subspecies, a question which has been ably discussed by Salomonsen (1955), and it is not inconceivable that some of the puzzling variation in the Yellow Wagtails may be due to incomplete allohiemy.*

Dr. Mayr comments on the unnatural—indeed, unique—pattern of distribution in which we have one form (of sp. *lutea*) in Great Britain, another in the west Asian steppes, and a third in eastern Siberia. The third, *taivana,* winters in south-east Asia and has no contact with the other two at any point: it is very different in plumage. The first two, on the other hand, both winter in tropical Africa—and they are so similar that many of them cannot be told apart. Is there a degree of synhiemy, as some recent writers appear to think, and if so how wide is the overlap? The general principles enunciated by Salomonsen may have much to do with the morphological likeness of these yellow-headed forms. It is extremely difficult to visualise what is the common denominator in the environments of Great Britain and the Kirghiz Steppes that is selecting like populations: in the winter environment—and perhaps on spring migration—the opportunities for contact are apparent.

Dr. Mayr is not convinced by my theory that the likeness of *lutea* and *flavissima* may well be due to gene-flow between the two caused by a small and possibly annual leakage of *flavissima* to the west Asian steppes; but Salomonsen's exposition of the selective effects of factors of the winter environment, Wallace's (1955) observation of a different habitat-preference between "yellow-heads" and "grey-heads" on migration, and all we have recently learned about *dis*orientation in migrating birds, lend cogency to this theory, and it should not be lightly dismissed. Admittedly, we have no precedent for such belief—but then, as Dr. Mayr points out, this is a unique case.

*Salomonsen (1955) proposes the term *allohiemic* for species or subspecies which are wholly segregated in their winter quarters; and *synhiemic* for the opposite condition in which populations occupy a common wintering-area.

Furthermore, Dr. Mayr remarks that if *lutea* were successful in recruiting a small number of *flavissima* from tropical Africa every year (possibly young birds, in which the "homing" instinct is less perfectly developed), "it would surely lead to an eventual depletion of the British population". This is in fact happening. The Yellow Wagtail has disappeared from Ireland and from the whole of Scotland except for an isolated pocket in the Clyde Valley, and has decreased over the last hundred years in parts of Wales and over much of England—Kent, East Anglia, Hereford, Worcestershire, Warwickshire, etc. (Smith, 1950). One suspects that the pockets on the Channel coast of France, like the Clyde valley and the former Irish populations, are the remnants of a once-wider distribution rather than new attempts at colonization. Much —perhaps most—of the retraction of range is peripheral, as would be expected if there are too few young birds returning to maintain the population at its normal level (*vide* Fisher, 1955). Of course, this recession of *flavissima* might have other, more complex causes: but the decrease is apparent in widely-separated areas and in different types of habitat. Here again is an aspect of the problem in which quantitative and qualitative field observations are a desideratum.

Certainly the reproductive isolation between the "grey-heads" and the "yellow-heads' is not complete, but present evidence suggests that it breaks down at the level of the individual, not the population. Certainly it has reached a firmer stage of evolution than in the zones of secondary intergradation between neighbouring "grey-headed' and "dark-headed" forms (Mayaud and others). It is perhaps merely a matter of convenience whether or not one distinguishes taxonomically between the two phenomena; my own inclination is to acknowledge the difference by splitting this diverse assemblage into two at this level, for I feel that the recognition of two species better expressess the relationships and helps to clarify the evolutionary situation as far as we are able to appreciate it at the present. It is of course not the only difficult and debatable case so far as British birds (let alone birds of the world) are concerned, for there is the curious paradox of the redpolls. The biological argument for two species instead of one is surely much more clear-cut in the case of the yellow wagtails, in view of the fact that interbreeding between redpoll "species" *flammea* and *hornemanni* involves whole populations—so-called *Carduelis flammea islandica* in Iceland, and *C. "hornemanni" pallescens* in northern Europe (Salomonsen, 1928, 1951). Yet absurdly we insist on two good species for the redpolls, and cheerfully lump all the Yellow Wagtails into one. KENNETH WILLIAMSON

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SIRS,—Dr. Ernst Mayr (1956) has written a closely reasoned and concise assessment of the present state of our knowledge of the problem of the Yellow Wagtail (*Motacilla flava*) complex. Those who regard this problem from a biological view-point will welcome the balanced arguments he develops in pointing the middle way between the rather exuberant application of the "drift" theory by Williamson (1955) and the pebble-sorting approach of Grant and Mackworth-Praed (1952). As Mayr rightly says, the field-ornithologists will have the last word, and to them he poses a number of questions.

To two of these questions the answers are already known. Mayr asks (*loc. cit.*, p. 118), in relation to the co-existence of *flava* and *flavissima* in eastern England and western France, "Do they arrive at different dates in the spring and are they therefore out of step physiologically? Do the *M. f. flava* immigrants arrive as solid flocks and then colonize a breeding area as a flock, so that they are inclined to form pairs only with other individuals of this flock?" The answers to both questions lie in the fact that the main bulk of male birds of both races, often travelling together in mixed flocks from West Africa, normally arrive at the breeding grounds between one and two weeks before the females. On arrival they prospect suitable territories and await the hen birds. There can normally, therefore, be no question of physiologically significant variations in the dates of the migratory movement, nor of exclusive pairings of males and females from within a closely-knit, mixed flock.

What is urgently needed is a detailed study in the field of the races of Yellow Wagtails in those areas where their breeding-zones overlap, for, as Mayr remarks, no such study appears to have been made. We do not yet know whether, in these zones, biological isolation is achieved by the races, nor, if it is, by what means.

Williamson's application of the theory of "drift" migration to the Yellow Wagtail problem focusses attention on the need for an expert re-appraisal of all the "variant" wagtails that have appeared in this country. "Drift" cannot be selective because it depends on the chance juxtaposing of an air-current and a bird or flocks of birds. If our variant wagtails are hybrid birds that have been bred in zones of inter-gradation stretching across Europe and Asia, and have been drifted here, then the probability that one such bird will reach us must be extremely small compared with probability that a bird of either of the races that produced the hybrid should arrive. This is obvious merely on statistical grounds based on the relative numbers of the three elements: Race A, Race B, Hybrid A × B.

Although I am no expert with museum material, my interest in Yellow Wagtails caused me a few years ago to work through some of the best collections in this country, and I then got the impression (which stands open to correction) that the number of variant wagtails obtained in this country was at least as large as the number of British-taken typical races that might have produced them, had the variants been hybrids of those races. STUART SMITH

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IS THE PHOTOGRAPHY OF BIRDS AN EVIL?

SIRS,—I read with considerable interest your Editorial comment (vol. xlviii, pp. 517-522) upon the subject of birds, the people who watch them, and nature reserves, and was pleased to observe that a more intelligent approach to the problem of protection is now becoming practice rather than theory; for this the Nature Conservancy, and the other responsible bodies, are to be congratulated.

Although you quite correctly condemn the unscientific collection of birds and their eggs, you would appear to have completely overlooked one of the similar problems which seems to have evolved from the fact that although far less physical collecting now occurs, the hunting and collecting instincts of the inhabitants of these islands are far from being dead or dormant. I refer to the present-day photographer and I cannot help but feel, without wishing to be considered in any way unduly critical, that your journal and several of your contemporaries have, by the publication of many excellent photographs of birds at the nest and in other situations, been the indirect cause of the present spate of people with cameras "hunting and collecting" birds.

One is always assured by those that engage in this form of hunting and collecting that they go to great pains to ensure that the birds do not desert their nests or are disturbed unnecessarily in any other way. However, I, for one, am far from convinced that however careful they may be, they are not causing senseless desertions of the nest or distress in other ways.

The publication of a photograph of a Grey Lag Goose, which was taken near its nest, as the front cover of the annual report of the senior protection body in Britain can hardly be described as a good example of care when it is remembered how prone this particular species is to desert the nest given the slightest provocation. Similarly, the lengthy business of "just one more shot" of the rare migrant at the bird observatory, the bird having in all likelihood already endured a prolonged laboratory examination, is not in the interests of a bird still in the throes of an arduous migration. Nor is the harrying of an obscure wader from one pool of water to another, purely for the purpose of getting a "shot", good practice. These examples are but a few of many which I have witnessed in recent years and I have little doubt that your goodselves, and many of your readers, can recall similar incidents.

While I agree that the bird-watcher at large is becoming a serious problem to the avian population of this country, I would seriously suggest that it is not the man who sits on the bank and watches, either for aesthetic pleasure or in search of knowledge, who does the harm, but the person who must harry a bird for the purpose of photographing it for the collection.

I do hope most sincerely that you will find space to publish this letter for it seems to me that the situation is rapidly being reached where the much-maligned collector of skins and eggs is being replaced by a person who, either in the interests of science or purely for personal pleasure, is unwittingly bringing about the same destruction to which he is opposed, often violently, in other forms. Also, it is to be regretted that these people are being indirectly aided and abetted by the protectionist organizations themselves.

It is to be hoped that in the next breeding-season, and afterwards, those who photograph birds will first search their consciences to see whether it is purely the collecting instinct of the oologist in another form, or whether they consider they can truly make a useful contribution to our knowledge of the birds of these islands, by going into the field to "search for, harry and collect" our birds with a camera. PHILIP S. REDMAN

SIRS,—I am grateful for the opportunity of replying to Mr. Redman's letter.

Having myself been a bird-photographer for 30 years, and become acquainted personally with the great majority of my fellow practitioners and their methods, I feel that he presents a highly prejudiced view of the matter. "Collecting" does enter into it; the instinct is never far below the human skin, and the ornithologist of to-day is no exception. The list-maker, the diary-keeper and the ringer are all collectors in a way, and if the photographer is a collector, it is in the same non-destructive sense. But far more does he regard it as a field-sport, pitting his wits against the sharp instincts of a wild creature, and seeking a trophy of the encounter without loss of life.

There are certain accepted rules of conduct, which may be summed up in a single sentence: the welfare of the bird comes first. And as in most field-sports, enjoyment vanishes when the rules of conduct are neglected. *Of course* bird photographers take every precaution to avoid desertion, both from choice and common-sense. There is a great and fundamental difference between the egg-collector and the photographer. For the one an emptied nest means success. For the other a deserted nest means failure—and, furthermore, a complete dissipation of the travel, field-work and preparation that have gone before.

It would be foolish to pretend that desertions never occur. Inexperience and impatience can at times outstrip prudence, nor is the most conscientious of us wholly proof against disaster. The occasional reckless or selfish photographer cannot be condemned too strongly, though in fact he condemns himself, finding that he is no longer acceptable in sanctuaries, on private estates, or among his fellow-workers.

But I do submit, Sirs, that in the main, bird-photographers are people of integrity and sympathy, and that such bodies as the Zoological Photographic Club have, over the years, built up a standard of ethics in Britain which is as exacting as anywhere in the world. To speak of "harrying" and "senseless desertion" is colourful propaganda indeed. As first-hand evidence, I can of course quote only my personal experience, and it is that over the past five years I have had one desertion, and used a hide 120 times. It is, I agree, a desertion too many. On the other hand I have repeatedly seen birds not only dozing, but fast asleep in front of the hide; and this is not the behaviour of a creature that is harried or distressed.

Mr. Rêdman does not discuss the question whether bird photographs have any public value. I believe, most sincerely, that they have exercised an enormous influence in encouraging bird-protection, and fostering the climate of opinion that made the 1954 Protection Act possible. A great number of books and periodicals are enlivened by this cheap and accurate form of illustration; the educational aims, and the finances, of such bodies as the R.S.P.B. would suffer grievously without films or slides; and the Nature Conservancy could not have initiated the National collection of photographs that is now being formed.

Finally, I deny absolutely Mr. Redman's inference that photographers, or anyone else, should be *obliged* to make "useful contributions to our knowledge". We should all be at liberty to enjoy birds in whatever way we please, provided that every form of study and enjoyment is undertaken with the least possible disturbance to the bird, as you so rightly advocated in your December 1955 editorial. A. W. P. ROBERTSON

[The late Commander Robertson completed the above reply just before his sad death in June of this year. An Obituary notice appears on pages 492-493.—EDS.]

ALBINISM AND MELANISM

Sirs,—I am making a special study of the incidence of albinism and melanism in British birds. When sufficient records have been collected, it is my intention to analyse them statistically under families and genera, in order to ascertain which groups are most affected and, if possible, to find the reason why. For such a study to have any scientific value it is essential that a very large and representative volume of records be available. I should therefore like to appeal to readers to send to me, at 11, Deepdene, Potters Bar, Middlesex, all records of complete or partial albinism or melanism in any species that may come to their notice. The details required are species, date, locality and a brief description of the bird. The co-operation of the editors of county reports would be especially welcome. It may not be possible to acknowledge every communication, but in the event of publication full acknowledgements will be made. Bryan L. Sage

SURREY BIRD CLUB

Sirs,—The recent increase of interest in the birds of Surrey has led to the formation of an ornithological society embracing the whole of the county.

We would be grateful if we could use your columns to ask interested persons to write to Mr. Doughty at 82, Grove Way, Esher, Surrey. H. F. Dickinson and K. F. W. Doughty

THE BIRDS OF LEICESTERSHIRE

Sirs,—We are collecting information for a book on the birds of Leicestershire. We should be glad to receive any unpublished records for the county, which will be acknowledged, at 223 Swithland Lane, Rothley, Leics.

R. A. O. Hickling and R. Eric Pochin

"Movements of House Sparrows": addendum.—In his paper in this issue—see page 479—D. Summers-Smith refers to the possibility of Egyptian House Sparrows (*Passer domesticus niloticus*) crossing the Sinai desert with the troops during the 1914-18 War and thus joining up with the race found in Palestine (*biblicus*). House Sparrows did in fact cross the desert. When the infantry brigade with which I was serving reached Birel Mazar, 80 miles from Kantara on the Suez Canal, we found them there in large numbers. British and Anzac mounted troops had arrived there some days before, but from them I learnt that sparrows appeared immediately the horse-lines were formed, as they had done at each camp in the methodical advance across Sinai. El Arish, the next stopping place in the advance, the first town on the eastern side of the Sinai desert, to which the sparrows from Birel Mazar will have accompanied the mounted troops, was as far east as the division went and I have no further information of their movements, but it seems almost certain that *niloticus* met *biblicus* at El Arish. An examination of the House Sparrows in that town and in the next towns of Rafa and Gaza would show whether they inter-bred.

It would be interesting to know whether the troops in the N. African campaign in the 1939-45 War were followed by sparrows into the arid parts of the desert or whether it was *entirely* the food of the horses, mules and camels of the earlier war that supported them across 100 miles of uninhabited waste. A. W. Boyd

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Compiled by Miss N. D. Giffard

Entries are in a single list with references to:

(i) every *significant* mention of each species, not only in titles, but within the text of papers and notes, including all those appearing in such lists as the *British recoveries of birds ringed abroad* ; there are also references to each species noted in the summaries of county bird reports ; in the case of such groups as "Warbler", "Thrush", "Duck", etc., there are cross-references to those members of the family which do not bear the family name and so appear elsewhere, e.g. "Blackcap", "Fieldfare", "Wigeon", etc. ;

(ii) scientific nomenclature listed under generic names only ;

(iii) authors of all papers, notes, and letters ; and photographers ;

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